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WORLD POSITION OF JAPAN'S IC INDUSTRY DISCUSSED

Tokyo TSUSAN JANARU in Japanese Feb 82 pp 16-28

[Special report: "Industries of the World--Electronic Equipment": Roundtable discussion by Atsuyoshi Ouchi, vice president of the Nippon Electric Co Ltd; Yoshitaka Tsutsumi, commentator of the Nihon Keizai Shimbunsha; and Akie Kataoka, chief of the Electronic Device Section, Electrotechnical Laboratory, MITI; and moderated by Kazuyuki Wakasone, chief of the Electronic Equipment Section, Machinery and Information Industries Bureau, MITI]

> [Text] A discussion was held on various aspects of what Japan's IC industry should accomplish in the future to lead the world, now that it is the frontrunner in the world.

Wakasone: Thank you for your attendance and participation in a discussion on the subject of Japan's IC industry, which has been selected as the fifth topic in the series "Industries of the World."

First of all, as a short overview of Japan's IC industry, in 1980 the production value was 577.2 billion yen, exports 183.3 billion yen and imports 181.9 billion yen, while for the period January to September 1981, the production value was 496.5 billion yen, exports 141.7 billion yen and imports 82.1 billion yen. When compared with the figures for the same period in 1980, the production value in 1981 showed an increase of 21 percent and there was hardly any noticeable fluctuation in exports and imports. In any case, an annual production worth 570 billion yen for an industry surely indicates a standard of respectability.

Although exports of computer-use memory units were favorable last year, with the production of 16 K memory units reaching a peak, it is reported that 64 K memory units will be in full-scale production this year. And based on reports of the development of an IC with high-speed operations as a product of a large project such as supercomputer development, as well as the development of new type semiconductor elements within the System To Develop Technologies as the Foundation for the Next Generation Industries which started last year, although the year 1982 may witness some frustrations, it may also have many rewarding moments.

Today our discussion will be focused on the various aspects of IC. As a start, Mr Kataoka will give a general introduction on the history of IC research and development.

The Stages of IC Technology

Kataoka: The United States was the dominant country in early research on IC technology. The origin of IC technology lies in the invention of transistors in 1948, and the first transistors were based on germanium; therefore, the beginning of the history of today's IC technology is believed to be 1954, when silicon transistors were perfected at Texas Instruments. But the transistors of the early years were not shaped for IC structuring. In 1957 and 1958 Fairchild developed plane technology by forming the transistors in a horizontal direction; in the beginning it was considered a manufacturing technology suited for mass production and there was no thought of its use in connection with IC.

But as the transistors and related components became progressively smaller in size and were used in large quantities in the circuits, the wiring technology became highly complex and the reliability of the packaging and soldering became a problem. Out of the need to solve the tangible problem of the wiring technology, Texas Instruments developed the technology to incorporate germanium into semiconductors by using the mesa structure and cutting technology. Just about the same time, Fairchild developed the technology of having the various components designed for structuring within semiconductors, employing the technique of the plane technology on the silicon. These events occurred around 1959, and it is generally thought that they form the basis of what is known today as IC. Therefore, it can be safely said that today's IC technology was born out of the necessity to simplify the wiring complexity and to improve its reliability. Truly, technologies are born of necessity. As regards this IC technology, the technological developments in the United States were undertaken with huge federal appropriations, principally by NASA and the military in the early 1960's, and as a result lively movement occurred among the various civilian companies as to the applications of the IC technology in the industrial world. In Japan, IC using germanium was perfected at the Electrotechnical Laboratory in 1961.

After that, the MOS-type semiconductor element, which had an insulating layer and a metal cover, in contrast to the bipolar transistors used previously, appeared in the early 1960's. Then RCA announced its MOS IC in 1962 and with it IC technology advanced into LSI.

The semiconductor technology flourished in the latter half of the 1960's and many companies, like Intel and Mostek, mushroomed throughout the United States. Industrial competition in the mastery of the LSI developed spiritedly from the latter half of the 1960's up to the 1970's, an era full of activities. Then upon entering the 1970's, LSI reached full-scale proportions with the adoption of the ion-implantation technology, and further on, technological developments in VLSI were undertaken throughout the world starting in the second half of the 1970's. In a nutshell, this is a stage-by-stage description of IC technology.

The Course of Japan's IC Industry

Wakasone: Back around 1958, when translating U.S. publications, I was troubled for want of a suitable translation for the frequently appearing term "integrated circuit." I translated it as "assembled circuit" after much anguish, but later, upon returning to Japan after spending a year in the United States, I was astonished at the precise terminology for "integrated circuit."

There have been spectacular developments in the progress of IC since then, but I believe considerable hardships were encountered in its industrialization. According to the ranking of a foreign magazine, the Nippon Electric Co Ltd today ranks as the world's second largest IC company, next to Texas Instruments. Mr Ouchi will give us the history of IC industrialization.

Ouchi: I shall present the history of IC industrialization with emphasis on Japan. The conversion of IC into consumer products in the United States began around 1961 and 1962, but for 2 or 3 years after that, the bulk of the goods was supplied to NASA and the military. On the other hand, without any consumer as large as NASA or the U.S. military, the conversion of IC into consumer products began around 1965 and 1966. In 1966 when I was appointed director of the IC Design Headquarters, which Nippon Electric Co Ltd established for the first time, I thought it was about time something should be made for consumption in Japan, and I believe all the other firms had the same view.

But with a discipline of this sort, where the progress is highly competitive, a lag of 3 or 4 years behind the United States in the conversion into consumer products meant a fairly large gap. A few years back, a representative of the British research company MacIntosh made the following remark: "America's excessive subsidization of industries with government appropriations during the early stages of IC development caused a strain, as related to industrialization, in the free competition among industries of the free world. For this reason, independently the various industries of Europe cannot compete against America, which has consistently maintained its dominance since then. The governments of the European countries must offer more assistance to industries." But it was in this manner, with the United States taking the lead, that the world's IC industry got its start.

In the beginning, when practical application started in Japan in 1965 and 1966, we were limited to using it here and there within the company for computer use, but about that time the Nippon Telegraph and Telephone Public Corporation decided on the trial manufacture of an electronic switchboard with IC. Our assistance in the project was the first step in our firm's engaging in limited mass production. Again, the Nippon Electric Co Ltd, in joint research with Sharp Corporation, with Nippon Electric Co Ltd in charge of IC, completed the world's first electronic console using MOS IC in 1966. This became the first step in Japan's electronic console gaining supremacy over the rest of the world, and for Japan to become so strong as to cause trade friction with the MOS memory unit is attributable to the proficient MOS IC being added on by Japan's electronic console manufacturers.

In this manner, IC manufacturers and electronic console manufacturers in Japan worked together and got off to a very good start. but the honeymoon period did not last long. In 1968 and 1969, the United States made MOS LSI for electronic console use and began exporting them to Japan. The various electronic console manufacturers in Japan tied up individually with U.S. LSI manufacturers on a one-to-one basis, and for awhile, Japan's IC manufacturers were in a state of surrender. During that period, IC was still not noted on the list of liberalized trade items, and because LSI could not be produced in Japan, its importation had to be recognized.

This sort of drastic change brought about a strong sense of crisis for awhile, but because the Japanese are industrious and try their hardest, their technologies gradually improved. And within a few years, it reached the point where it was said that Japan's LSI were of better quality. Moreover, by using U.S.-made LSI of poor quality and having inferior products piled up in the electronic console, the situation of no compensation unless specified by the contract continued, and the electronic console manufacturers who had tied up on a one-to-one basis with the U.S. LSI manufacturers unanimously expressed dissatisfaction and simultaneously began to switch to Japanese manufacturers. This was around 1972. And as drastic as it was to be overwhelmed by U.S. LSI, it was equally drastic when Japanese technology rolled back. The fact is that the technology during this period continued on to today's MOS memory units. IC liberalization occurred around 1963. We wondered what would happen if, after being pressured by the U.S. LSI manufacturers in the electronic console market, liberalization occurred. Well, thanks to liberalization Japan's IC industry became stronger. From that time up to the present, a number of severe changes have affected the IC and applied equipment markets. For instance, a transceiver boom occurred just before and after the first oil shock, and there was a time when manufacturing IC only for transceivers was profitable, but the boom went out like a light, leaving both transceiver and IC manufacturers stranded.

After going through these experiences, the microcomputer finally appeared. Microcomputers were first put on the market by the Intel Company of the United States in 1971, and Nippon Electric Co Ltd had its product on the market 2 years later. The present state of affairs is that the microcomputer, along with the memory unit, nay, more than the memory unit, is the driving force of LSI.

The United States traversed almost the same course, but unlike Japan, which progressed with MOS as its principal strength, probably because of the strong influence exerted by NASA and the military, it progressed with bipolar IC as its principal strength. Apart from the MacIntosh remarks, Europe, probably because it was later in recognizing the importance of IC than the United States and Japan, is roughly behind by about 3 years, and the present state of affairs is one of frantic activity, having only recently realized the importance of IC. From the standpoint of industrialization, the socialist countries are believed to be behind the Western European countries by a few years.

Wakasone: The situation in the world was touched upon briefly, but, although a keen competition exists between the United States and Japan, very little is known about Europe. Can you describe the competitive power among the United States, Japan and Western Europe, and Japan's position relative to the other others?

Ouchi: Generally speaking, as to the ratio of the demand for IC, if Japan is 1, then Western Europe would also be 1 and the United States 2. However, there is a difference in production shares, and the United States controls 60 plus percent of the world's production shares. In the case of Japan, the bulk of some of the export surplus items is directed at Southeast Asia, and because the shares are considered to be practically self-sufficient, the fact is that Europe is being curbed by the United States.

The major portion of IC made in the EC are products from factories of U.S.-affiliated companies, such as Motorola and Texas Instruments in Europe. The present situation is that the large, native European manufacturers, such as Siemens in Germany and Phillips in the Netherlands, are being stymied a great deal.

The Present State of U.S.-Japan Semiconductor Friction

Wakasone: As soon as Japan's IC industry began exporting to the United States after being smoothly nurtured, the press sensationalized the issue of U.S.-Japan friction in semiconductors. This controversy is believed to have started around 1977, but last year the early reduction of duty on semiconductors was mutually agreed upon between the United States and Japan, and for the present it has been settled at 4.2 percent for Japan and 4.24 percent for the United States as of April of this year, but 4.2 percent for the United States also beginning 1 January 1983. The duty rate is still 17 percent for the EC, but by early reduction of the final objective in a swift move at the Tokyo meeting, the United States and Japan will become the most liberal semiconductor markets in the world. Mr Tsutsumi will review these recent developments and furnish a journalist's view.

Tsutsumi: In a broad sense, the U.S.-Japan semiconductor friction is part of the U.S.-Japan trade friction. The latter began with comparatively low-level industrial commodities, such as Western cooking utensils, cotton fabrics and miscellaneous items, but then the scene shifted to such leading industrial goods as steel, home electrical appliances and automobiles, and finally it burst into semiconductors, which is one of the advanced items that America had utmost confidence in. I believe that there is a symbolic meaning. That is, there is evidence that Japan's technological prowess and industrial strength are internationally strong to that extent, but in America about 40 companies, principally in the Silicon Valley, organized the Silicon Industries Association [SIA] to launch a vigorous lobbying campaign in Washington, D.C. Although there has been a lull in their activities recently, I believe that this sort of lobbying will assume an accelerated pace hereafter.

Heretofore the problem has been strictly for Silicon Valley. Basically the SIA is an organization of small and medium enterprises which compare unfavorably with Japanese manufacturers in marketing and other fields, and such major companies at TI and IBM are not members. But recently, it is reported that the operations at TI, with annual sales of $4 billion and a favorable semiconductor set up, are not moving very smoothly and that IBM's growth, as compared with the past, has stopped, which means that in the future the strongest possibility exists of a huge anti-Japanese movement not only by Silicon Valley on the West Coast, but also by Silicon Plain in the South, the Silicon Belt on the East Coast and even engulfing Europe. Because the lobbying campaign is being vigorously launched to focus on two points--the first being that the United States has begun to lag behind Japan in the sophisticated technology which had been its pride, and second that the problem involves national defense--it is thought that the possibility exists of this voice of protest becoming louder.

Another thing is the underlying reason for SIA conducting an active lobbying campaign. The fact is that the semiconductor manufacturers in America, in contrast to those in Japan, are small or medium enterprises which are separate from the mainframe manufacturers, who, because they handle the finished product, realize a reasonable profit, whereas the semiconductor manufacturers make only a small profit. On this point, the Japanese manufacturer is versatile, making home electrical appliances, generators, communications equipment as well as computers. Because it operates under one large roof as an integrated enterprise, the results of its technological development can be beneficially utilized in the various departments, thereby having an overwhelming advantage when compared with the U.S. semiconductor manufacturer.

Also, quality management in the United States is not necessarily good. This is possibly related to munitions, for in America the premise in quality management is to increase costs, whereas in Japan it is to lower costs. Trading provisions, such as duties, are definitely equal, and if Japan becomes stronger in a state of equality, surely America will not stay still. Especially since Silicon Valley is in President Reagan's home state of California, it is believed that the trend of the future cannot be optimistic.

Industrial Strategy of U.S. and Japanese IC Manufacturers

Wakasone: Even though classified as semiconductor manufacturers, conditions differ between the large companies and small and medium enterprises, but recently U.S. semiconductor manufacturers have moved into Japan. This sort of involved business relationship of U.S. manufacturers expanding in Japan and of Japanese manufacturers branching out in the United States is believed to be a desirable one in various ways, and we welcome this sort of arrangement. Mr Ouchi will speak on management strategies of U.S. and Japanese industries.

Ouchi: Mr Tsutsumi sounded extremely apprehensive but because I am by nature an optimist or probably because my wish is that things must fall in proper place, I think on the contrary that events are moving in the desired direction. It is a fact that one of the problems, from the standpoint of management strategy, was that heretofore Japan had integrated manufacturers whereas the United States had small and medium enterprises which specialized in IC manufacture. However, as for the independent small and medium manufacturers in Silicon Valley, the Nippon Electric Co Ltd bought out one of them, some were absorbed by Siemens and Phillips, others were successively integrated into large American companies, and in terms of scale, they have gradually begun to resemble Japanese companies. It is thought that these changes will become a factor in solving the friction problem.

Another thing is that it has been said all along that, heretofore, Japan was a step ahead of the United States with respect to production technology for quality products at inexpensive cost, but when compared with the United States, Japan is weak in the area of basic development; on the other hand, the United States is strong in the area of basic development but poor in quality management and production technology. But in recent years, management in America has begun to place great emphasis on quality control. As an example, at a seminar sponsored in Washington, D.C., by the Electronic Industries Association of Japan in 1980, a section chief of Hewlett-Packard Co, which is an American IC user, ranked the quality and reliability of both U.S. and Japan-made IC used by his company, and at that time the top three were Japanese manufacturers and the bottom three were U.S. manufacturers. Moreover, the rate of defective IC's was reported to be different by several times. However, a year later, that is, last year, the same section chief reported at the seminar in Washington, D.C., that "U.S. manufacturers are among the top three and the gap has been reduced."

The United States did not attach importance to quality management of general consumer goods because previously it had been confident of being unrivaled throughout the world and because it had huge purchasing agencies such as the military and NASA, but faced with the Japanese offensive, it had to think again. Because it has wrought such changes in just a year and, above all, because it is a country of strength and wealth means that Japan cannot be complacent, relying on quality and other factors.

On the other hand, Japan used to be considered weak in research and development, but in recent years, the activities of the Japanese have become prominent, with outstanding patents and favorable theses submitted at international scientific gatherings. This was because after the war, the smart Japanese brains were occupied in catching up, leaving no time to develop their originality, but today when they have caught up and overtaken in the state of manufacturing, it can be said that finally they have begun to have the time to develop their originality. In this respect, it is a fact that Japan is about to draw close to the United States. Thus, the patterns of technology of the United States and Japan have become similar.

From another aspect, it has been said that American management executives cannot invest in facilities from a long-range viewpoint because they are accountable for achievements in a short period; however, recently, such has not been the case with IC. Also a mood to absorb the virtues of Japanese-type management, and not only with regard to IC, has spread among some American management executives.

Furthermore, while the IC industries in the United States and Japan are getting to resemble each other in many respects, already extensions in the IC industry have begun, unlike the automobile industry. Not only Nippon

Co Ltd, but Toshiba Corporation, Hitachi Ltd and Fujitsu Ltd already have plants in the United States, and Nippon Electric Co Ltd has begun construction of its second plant. Heretofore, only TI from America has had a plant in Japan, but recently Motorola and Intel have made inroads in Japan. If this sort of mutual extension becomes increasingly active, difficulties will arise in the interpretation of trade balances; before this sort of dilemma is reached, if precautions are taken so as to avoid occurrences such as the 10-year TV war when Japanese manufacturers were subjected to dumping suits, the situation should be smooth beyond expectation. I hope things will move in that direction.

Wakasone: As for IC trade with the United States, Japan had an unfavorable balance of trade in 1979, but there was a slight favorable balance of trade in 1980. However, for the period January to September 1981, as a result of the above described mutual extension, a very desirable state was achieved with a near balance of 49.6 billion yen in exports and 48.9 billion yen in imports. It is considered that it would be a good thing to dissolve the friction starting from this point.

The Hard Lesson From the 10-Year TV War

Wakasone: As for the memory unit for computer use as described in the opening paragraph, the 64 K reportedly will be in full-scale production in 1982, but recently newspapers have given prominent coverage to reports such as Company A being prepared for a monthly shipment of 300,000 units or of Company B being prepared for a monthly production of a million units. A great many people appear to be concerned about overproduction. What is the state of affairs?

Ouchi: The 64 K will probably become the top IC memory unit, at the earliest, after the middle of this year. At the present stage, the various computer manufacturers, which are the largest users of the 64 K throughout the world, are evaluating the trial manufacture of memory systems using the 64 K. The reports in the various newspapers contain wishful surveys on demand by the various manufacturers; it is believed that with this type of new product, since the cost gets cheaper as the running curve rises, after a share is first secured, most of the figures are based on a wish to get as big a share as possible. Doesn't the total of such figures exceed the demand of the world? Since the various manufacturers are not expected to undergo a loss with huge unmarketable inventory, for the present they are expressing a hope, but actually things will settle down on the basis of the supply-demand balance.

Quite a bit of publicity has been given to reports that Japanese companies have already garnered 80 percent of the U.S. market with the 64 K, etc., but this is based on the sample stage talks and by no means does it concern a firm situation for the future. To be sure, America is late in its recovery, but recently the yield of American manufacturers has increased and therefore it is believed that things will not reach the danger point.

Wakasone: Because Japan has waged fierce competition, the price problem is a matter of concern. We are extremely fearful of any misunderstanding regarding price by foreign countries. Of course, there will be no dumping, but if a rock-bottom offer is made after careful operational calculations, immediately the possibility exists of a dumping accusation that can occur not only with regard to IC but in any field. Even if cleared of the accusation in the end, even one such action would cost a lot of money and time; so I think that the important thing is to avoid being the object of suspicion, and certainly the various companies are fully aware of this point.

Ouchi: Japanese semiconductor manufacturers are also engaged in TV manufacturing, so they all had the painful experience of the TV dumping suit that lasted for 10 years. Although they were cleared in the end, as Mr Wakasone mentioned, when loss of trust, loss of business opportunities and lawyers' fees during the period are considered, an enormous loss is incurred, and although the problem is faced by the manufacturers individually, I think that the Japanese manufacturers all have sound judgment.

However, difficult problems arise from the new trade laws, such as the unacceptability of the selling price in the United States today being the same as the selling price in Tokyo today. If the price after deducting warehouse stock costs by the marketing company in America is cheaper than the price in Japan, the ruling is dumping. This is a stiff restriction on such goods as IC, which is subject to a fast drop in prices. But since laws are made to be obeyed, I have always said that "there's no need to sell if the risk is the danger of dumping, because markets exist not only in America." I think that other manufacturers are also heeding this point.

New Frontiers Out of U.S.-Japan Cooperation

Wakasone: Mr Tsutsumi, do you have any other matters to discuss regarding semiconductors as pertains to the U.S.-Japan relationship?

Tsutsumi: It is true that semiconductors are components and not final products, and therefore the nature of their friction is different from that of automobiles, TV, etc., and recently their mutual extension has progressed, which is a desired trend. However, as stated previously, optimism cannot prevail, for even a giant company like TI can meet a crisis, which means that the need exists for a thorough accounting.

Then there's the matter of concern about the honesty of the workers. At a firm called Monolithic Memory Co, 500,000 units of chips were stolen despite locked warehouses with electronic guarding devices trained on them. Theft has occurred twice in 1 year at this firm, and the same type of theft occurs throughout Silicon Valley. It is rumored that the final destination of the stolen chips, via Germany, was the Soviet Union for use on the MIG-25, and the difference in honesty between workers in the United States and Japan, which already shows a marked difference, may increasingly widen. This is not simply a trade problem, but it has become a national defense problem, and so it behooves Japan to be mindful of this matter.

My biggest concern is the fact that equal footing does not necessarily mean equal partnership. Even if the same provisions are applied, a sense of danger will be stirred up, especially if the United States cannot match Japan, and on this standpoint the semiconductor will serve as a genuine symbolic item that takes into consideration the relationships of trade, technology and friendship between the United States and Japan. The present semiconductor market is somewhat limited and friction can easily occur. Pioneering for end use production requires investments in plant and equipment, but it behooves the United States and Japan to cooperate in developing new markets, new frontiers and new products.

Ouchi: My optimistic views, mentioned previously, are based on the ample room for the creation of new markets, at least to the end of this century, for IC, which has been exploited especially by the frontrunning microcomputer, etc. If the emphasis on competition is placed on the creation of new areas for demand and not on fixed areas for demand, then it is considered that peaceful coexistence is possible.

But my optimism, as mentioned previously, is wishful optimism, and as Mr Tsutsumi remarked, danger definitely exists. A high-ranking official of the U.S. Department of Defense remarked: "The military order of the Western camp has been maintained only because of the preservation of absolute domination by the Western camp based on America's IC and computer. The fact of IC technology of Japan or Europe reaching the same level as that of the United States, from the standpoint of national defense, poses an alarming problem."

Confronted with that sort of thinking, the manufacturer has no recourse at all. In such a situation we would have to ask for government intervention.

Why the VLSI Project Was Successful

Wakasone: This means that consideration must be given to various aspects. At this point let us change the topic to a technological development keyed to the future. By nature, joint research is an extremely difficult accomplishment, but an example of great success is that of the VLSI project. Mr Kataoka will describe the aims of the VLSI project, the achievements and a followup on the various companies.

Kataoka: Previously there was some discussion critical of Japanese originality relative to industrial activities of the United States and Japan, but in reviewing recent trends, granted that the start of technology was furnished by America, I believe that the reason for the Japanese being equipped with such technological knowhow is because they have developed their originality in various ways in delicate areas, and the product is reflected in their industrial activities. The Japanese technologists were equipped with qualities over and above those possessed by merely an excellent student, and this led to the success of the joint research on VLSI that became a model accomplishment.

The origin of this joint research was the knowledge that semiconductor equipment with an extremely microscopic structure was probably used in the future system computer of IBM and the urgency to establish a microscopic processing technology in order to deal with the situation. The joint research was undertaken for 4 years starting in 1976, but the big reason for achieving the considerable results probably lay in having the objective of the research narrowed down to focus on the basic technologies, with possibilities for use in the various disciplines. It is believed that the accomplishment was attributable to the many outstanding technologists who concentrated and pooled their resources with a burning desire to develop new disciplines.

Concretely, the objective was an integration of 1 megabit per 1 square cm, and originally it was to establish a microscopic processing technology that could cut 1 micron in size. However, as a result of the 4-year joint efforts of the researchers, numbering about 100 on temporary loan from the Electrotechnical Laboratory and 5 computer companies, first the electronic drawing technology, and then the transferral technology using various methods with electronic lines, optics, X-rays, etc., were established. Even regarding materials, the defects of the silicon after material, curvature of materials and other delicate basic problems were solved.

And because the results could be focused even in the development of various types of semiconductor device manufacturing equipment, the ripple effect was very great and thereafter greater benefits were reaped from the technology, not only by the five participating companies, but by the wide range of industries related to electronics technology. In that respect, it was believed that the achievements of the VLSI joint research would become the potential strength for a wide range of activities for Japan's industrial world. It was thought that this was an example showing that, given a common objective, Japan's technological development power could contribute by lining up in the front rank in the world.

Ouchi: The theme was right and so was the timing. If VLSI had been merely an extension of the optics technology possessed by the various semiconductor manufacturers, the advanced companies would probably have hidden their latest technology, the lagging companies would have attempted to steal from others, and the project would have been surrounded with suspicion. Quite the contrary, just about that time it was learned that the VLSI for use in the future system computer by IBM was not an extension of optics technology but one that probably required the technology of either the electronic beam or soft X-rays. That being the case, a sense of danger pervaded since even Japan's fairly large manufacturers, independently, could not develop such a manufacturing apparatus; moreover, since they were mutually beginning from zero, there was no room for suspicion.

When the young NEC engineers who participated in the joint project were asked for their impressions, they replied: "We were sent with a totally clean slate, and we thought that if our working performance was slower than that of the others, we would bring dishonor to the company by being referred to as NEC's mediocre technologists. We were hyped up." All the employees exerted maximum efforts in this sort of mood. This is probably one of the factors in the success.

Kataoka: From the standpoint of trend and timing in the technologies of the world, adoption of the electronic beam exposure device as the central subject was an accurate one.

Ouchi: Then, too, this is not to flatter MITI officials, but having the group of technologists from the Electrotechnical Laboratory participating and furnishing outstanding and impartial leadership was tremendously effective.

The Direction of Technological Development Hereafter

Wakasone: Recently, Americans and Europeans have shown strong interest in the success of joint research, which is a gathering of industries with competitive status, but it appears that competing while assuming a joint status is a distinctive feature of the Japanese industrial world. In the wake of the VLSI success, the large project on supercomputer development and the new functional element development project, which is a link in the System To Develop Technologies as the Foundation for the Next Generation Industries, were begun last year. Both of them are based on the burning desire to develop new devices. Mr Kataoka will speak on their future direction and on overseas trends of the same type discipline.

Kataoka: As described just now, even with IC technology, technological developments based on new viewpoints have begun. I believe it would not be a mistake to consider IC technology with silicon as the nucleus of the mainstay industry to support Japan's economy hereafter, except that it will not always be true to consider silicon as being almighty. In the field of electronics, it is thought that needs will arise that will make it imperative to use an element other than silicon hereafter.

As a concrete example, several years ago development of a chemical compound semiconductor was started in order to utilize luminous action, which is not possible with silicon, and its technological foundation is about to be established. This afforded an opportunity, for great efforts have been expended for positive utilization on an industrial level of the unique properties of this chemical compound semiconductor, which had drawn attention for some time. A representative example is the ultra-high-speed element. In other words, there are a number of semiconductors, other than silicon, with fast-moving electrons, and in the event the microscopic processing technology using the exposure device with these semiconductors is applied equally, depending on the differences in the material itself, the prospect of a performance far superior to silicon was revealed. One of these semiconductors is a gallium arsenide-related item whose electrons have a speed nearly 10 times faster than silicon, and as the hardware of the large project to develop a high-speed computing system for use in scientific technology which was started this year, it was decided to conduct full-scale R & D on it. Gallium arsenide not only has fast-moving electrons, but it has the advantage of acquiring the insulation material necessary in the assembly of various circuits. The capacitance latent in the insulation, which had been a problem with silicon, can be solved, and the making of a 30 picosecond high-speed element is expected.

Since 3 years ago in America, development of a gallium arsenide IC has been underway under military contract.

In that case, the basic technology for actual application will probably be that of an IC technology adapted from silicon technology or microscopic processing technology, but the problems peculiar to chemical compound semiconductors must be solved.

Also, the Josephson element, which was researched from way back by IBM and others, is theoretically known to move at an extremely fast speed. This is not necessarily an extension of semiconductor technology, but it is believed to open up an entirely new technology field. The Josephson IC is also included in the R & D plan for supercomputers.

The R & D of new dimension semiconductor elements was started by MITI this fiscal year. The R & D of new functional elements was selected from among the projects to develop the foundation for the next generation industries in the establishment of a basic technology which would support industries 10 years hence. These new functional elements are ones which will display new functions hitherto unavailable, and they will be divided into three kinds: the three-dimensional circuit elements, the super grid element and the environment-proof reinforced element.

From the standpoint of microscopic processing technology, heretofore IC technology has always been based on the premise of lining up many small items on a two-dimensional plane, but in seeking future progress, a line of thinking was born for using semiconductors in three-dimensional form. The three-dimensional circuit element, which is included in the System To Develop Technologies as the Foundation for the Next Generation Industries, is a basic project for the skillful realization of a three-dimensional, solid structured semiconductor, and by adding three-dimensional depth to the heretofore two-dimensional semiconductor technology, wouldn't a basically new type of technology be required?

It is believed that with the emergence of these products, the opportunity will be afforded to seek the evolution of new electronics. That is, the objective of a computer is man's brain, and the expression of its efforts is the material realization, but because the anatomy of living things--whether the brain or the sensory functions--always has a three-dimensional structure, some gaps have existed between today's technology and the anatomy of man and other living things. And it is possible that with the establishment of a technology to increase the dimension by one to three-dimensional, these gaps will gradually disappear.

Among the R & D plans is one that seeks a very high state of advancement by cramming the logic structure, or the memory structure in a three-dimensional state, by arranging the IC with a sensor function on the surface, arranging the processing function deep inside to process the output, and with the plan of a three-dimensional intelligent image processor that resembles the sensory function of a living thing. I believe that it can be anticipated that an extremely interesting sophisticated product will result.

As for the microscopic processing technology, since there is the need not only to miniaturize but also to achieve three-dimensional composition, development will be carried out along with a new exposure apparatus or exposure technology consisting of many elements that can be made to have proper high accuracy even if the surface is uneven.

Next, concerning the super lattice element with an advanced technology, not only is it structurally three-dimensional for incorporation, but, as for the material itself, it is believed that ideas will emerge on devising new functions by using material with a three-dimensional structure. Heretofore, making uniform-sized semiconductors was one of the objectives of the technology, but recently a new type of technology has been developed, that of stacking up a different kind of semiconductor with a microscopic structure which is based on optics technology, etc., and achieving unique performances with them. By piling up a different kind of material at intervals of several angstroms to several tens of angstroms, the new property, which hitherto could not be derived from an analysis of the physical properties of a semiconductor, such as an element stressing super high speed, is the super grid element. In this discipline, it is thought that it will become such a technological development that regarding its shape 10 years hence, there is no way of even making a forecast at present.

Heretofore, the prerequisites in the use of silicon were near normal temperature and a quiet environment, but the making of an IC that could be used with assurance even in bad environment is included in the R & D of new functional elements. This is an environment-proof performance even in space filled with strong radiation or in comparatively high-temperature areas, an element which can withstand shock, etc. It is believed that this will be a big boost in market expansion of the future semiconductor IC industry.

In any case, it appears that much of the R & D conducted by Japan thus far has been undertaken with a solid approach to positive objectives that could be fulfilled, but hereafter it is thought that Japan must assume a posture whereby it must contribute to the world through pioneering in new technologies and penetrating unexplored fields. In this R & D system which will last for 10 long years, it is believed that programming basic technologies in order to achieve these new developments will be linked to fulfilling Japan's major role in the technological progress of the world. This is the new course marked for Japan's technological development. We are hopeful of its success.

Technological Developments for Contribution to the World

Wakasone: In order for this huge population to survive in Japan, which has limited resources and energy, the government and the people have exerted efforts together to develop sophisticated technologies for application in industries. Recently, however, in light of Japan's remarkable achievement of success, criticism has been levelled at this joint enterprise of government and the people. This collaboration has been referred to as the high technology problem, or high tech problem for short, and representative examples of criticism are the speech made by the U.S. trade representative in the Congress, discussions held by OECD committees, etc.

At this point, I would like to remove a misunderstanding as relates to an action in the OECD. Talk has been circulating that Japan is criticized in the recently released paper by the Committee on Positive Adjustment Policy, in which various discussons are held on industrial policies, but the truth is that it is only a discussion report and, moreover, it is not necessarily critical of Japan. In other words, the committee specified three classifications--original technological development, imitative technological development and leapfrog technological development; it is reviewing the advantages and disadvantages occurring with government assistance in each case, and the subject of industrial policies is not directly criticized. West Germany emphasized that technological developments should be entirely left to the market mechanism, while France and Japan, where market mechanism is totally ineffective at the present state, emphasize that government intervention is necessary, and so the present stage is one of discussion on the various points.

As for the other, it is true that a speech directed at Japan was made in the U.S. Congress. At the International Trade Subcommittee of the Joint Senate and House Committee on Economics, the U.S. trade representative stated that the industrial policy "in Japan of government and private companies engaged in joint research, financial subsidies, preferential treatment with taxes," etc., as relates to sophisticated technology disciplines, contributes to the intensification of international competitive power in the field of sophisticated spearhead technologies. He added that because this sort of action can distort international trade in the future, America must consider counteracting measures. But even in the United States, the government is rendering various kinds of assistance, and West Germany, France and Britain, more than Japan, are disbursing huge sums of government subsidies in these disicplines. We cannot help but feel regret at this situation. What are your views on the matter, Mr Tsutsumi?

Tsutsumi: It is true that criticism by the United States and the West European countries lately has become stronger regarding the so-called national projects, that of technological development by government and private company cooperation in Japan, but there is a great deal of misunderstanding. For instance, with the VLSI technological development, which is an example of success considered rare in recent times, of the total expenditure of 70 billion yen, the government's share was no more than 40 percent or 28 billion yen. Of course, industry will pay back the government.

Ouchi: If profitable, it will repay.

Tsutsumi: In comparison, the VHSIC plan, which the United States pursued Japan with, is funded totally by the Department of Defense, even to the extent of buying up the products. From that standpoint, a good many false charges are apparent.

Recently, research investments in Japan have approached the ratio of 6:4, but previously, the pattern was a ratio of about 7:3, with the private sector assuming the greater burden. Moreover, the government's share of 3 was directly used by national universities or by government-related research institutes as grants, and therefore the private companies received very little.

Ouchi: Generally it was about 3 percent of the total investment for R & D by the private companies. The bulk was subsidies from MITI.

Tsutsumi: In the case of the United States, traditionally the government has appropriated more than 60 percent for R & D investments in military technology, space technology, electronics technology, etc. With such an involved historical background, America's accusation that appropriating government funds by Japan is outrageous lacks force.

One thing we should be careful about is that in the United States the government appropriates funds for such government projects as military technology and space development, whereas Japan, which hardly has projects of that sort, spends money on consumer goods used directly by the civilian populace. While assisting even the strong, any success achieved is converted for export purposes. The United States seems to be pointing at this sort of activity and so it is only natural to exert efforts to remove misunderstanding, and even so, there are factors which Japan must ponder over. As one means, recently Japan has been vigorously sponsoring international conferences on computers, optics technology, VLSI, etc., and so at these sites, Japan should seek understanding with comprehensive explanations on Japan's activities and at the same time engage in mutual study by public display internationally of the results. In technology, Japan is a first-rate country and it must assume a posture befitting its rank; otherwise problems will always remain.

Kataoka: I agree heartily. A technology is not something to be monopolized by one company or one country, but I believe it should be used effectively for all mankind. In this respect, what Japan does as technological development that can contribute to the world will greatly assist in solving the various international problems.

Wakasone: Hitherto, Japan had the United States and West European countries as its objective and strived to overtake their standard, but today that gap has decreased or Japan has surpassed them in some disciplines. On the other hand, today the developing countries are striving, with Japan as their objective, and therefore Japan must aim at more sophisticated fields in order to shift industries, and it must take the stance of releasing to the developing countries what it dealt with previously. In that sense, it is believed that Japan ranks with the United States and West Europe to compete in IC, and with its results Japan's promising industry can make a contribution to the world. I shall ask for your knowledge and assistance in the future and now I will close this roundtable discussion. Thank you for your time.

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PRESENT STATE, TASKS OF JAPAN'S SEMICONDUCTOR INDUSTRY

Tokyo TSUSHIN JANARU in Japanese Feb 82 pp 29-33

[Special report: "Industries of the World--Electronic Equipment": Article by Hideji Sugiyama of the Electronic Equipment Section, Machinery and Information Industries Bureau, MITI]

[Text] A review is made of the progress thus far reached by Japan's semiconductor industry, which produces one-fourth of the world demand, and an insight into future tasks is given.

The Beginning

Electrically a semiconductor is a solid substance that is placed midway between a good conductor, usually metallic, and an insulator made of either rubber or glass, and it has the unique characteristic of functioning either as a good conductor or an insulator, depending on its status. In 1948 Shockley, Bardeen and Brattain of Bell Laboratories developed the world's first semiconductor transistor by utilizing this characteristic.

Prior to the discovery of the transistor, there was the vacuum tube, within which was incorporated a heat source which released electrons, but the vacuum tube was plagued by a number of substantial problems, such as a high consumption of electrical power, poor structuring, difficulty in miniaturization and generation of a large amount of heat. Because it was possible to solve these problems at one stroke with the advent of the semiconductor transistor, the ripple effect it created was so great that the progress of electronics is said to have started here.

After the discovery by Shockley et al, remarkable progress was achieved in semiconductor R & D, and various elements possessing successively higher performance and greater reliability were developed, but the event that made the greatest impact on the electronic industry of today was the invention of the integrated circuit (IC) by Kilby in 1958. The IC is structured with many elements placed on top of a small plate, and it was epoch-making in realizing the miniaturization and high performance of electronic equipment. Computer progress today would not be possible without the IC. Recently a variety of commodities have been produced through its integration with machines, and it is the central item in the so-called conversion to mechatronics.

The Present State of Japan's Semiconductor Industry

The value of Japan's semiconductor production in 1980 was recorded as 864.1 billion yen, a 36-percent increase over that of the previous year, and it represented one-fourth of the world demand. Of the total, 293.8 billion yen was for single conductors, such as diodes and transistors, and 570.3 billion yen was for IC. The growth rate was 16 percent for single conductors and 50 percent IC.

This sort of tremendous growth of IC has been a consistent trend recently, and one reason for this is the increase in its use in new products. A truly wide range in application has resulted, such as watches and electronic consoles, it goes without saying; office appliances and equipment such as office computers, facsimile and word processors; home electrical appliances such as electronic ranges and air conditioners; adaptations with industrial equipment such as robots and measuring equipment.

According to the shipping information classifying use of the IC in 1980, 40 percent was for civilian consumer goods and 31 percent for industrial use. A large percentage of the civilian consumer goods is accounted for by such items as audio equipment, watches and electronic consoles, 12 percent each of the total exports; and TV and VTR, 10 percent each.

On the other hand, for industrial use, computers accounted for a comparatively large share, with 11 percent, and the rest was for a wide variety of goods.

The second reason for the growth of IC production lies in the increase of exports. The value of IC exports in 1980 was 183.3 billion yen, which was an increase of 69 percent over that of the previous year and accounted for more than 30 percent of the total IC production. Classification by destination showed 41 percent to North America, 20 percent to Europe and 39 percent to Southeast Asia. The principal exports to North America and Europe were MOS memory units, and those to Southeast Asia were MOS logic for electronic consoles and watches, and bipolar linear IC for household appliances.

Regarding IC, it must be noted that Japan's imports are also large. This is because Japan's IC market has expanded rapidly along with the progress of the various user industries, development of new elements by the United States as the leading nation in IC technology, etc. The value of IC imports in 1980 totalled 108.9 million yen, or about one-fourth of Japan's domestic market. In comparison with exports, there was an excess of imports until 1978; in the case of North America, which accounted for 65 percent of the imports, there was an excess of imports until 1979, then an excess of exports in 1980, but the situation is fairly balanced at present.

The History and Policies of Japan's Semiconductor Industry

The history of Japan's semiconductor industry, as with most of the other industries, began with the importation of technology from the United States. With the continued importation of basic patents from Texas Instruments, Fairchild, Intel, etc., investment of huge development funds and employment of highly qualified personnel, Japan achieved its present ranking of being abreast with the United States. Because the IC mass-production plants in Japan are greatly concentrated on the island of Kyushu, it is recognized worldwide as Silicon Island, one of the three largest semiconductor manufacturing regions in the world, along with California's Silicon Valley and Texas' Silicon Plain.

IC is divided into two categories, the bipolar type and the MOS type. Historically, the bipolar type was developed ahead of the MOS type and the former had the advantage of a faster operational speed than the latter, so for these reasons the U.S. companies undertook vigorous development of it. A wide gap in technological differences existed between the United States and Japan in this field. For this reason, Japan's IC manufacturers targeted the MOS type, which is slightly slower in operational speed but suited structurally for mass production, besides having lower power consumption, and they energetically engaged in its development. As a result, Japan grew until it led the world in this field, and it has developed MOS IC factories to produce a wide range of products, from watches and electronic consoles to computer-use memory units, etc.

But the history of this development was by no means smooth. Because it was one of the more sophisticated technologies in electronics, IC possessed a number of special characteristics not seen elsewhere, and extremely severe restrictive conditions arose when civilian enterprises engaged in the development and production of IC regarding these characteristics.

First of all, huge sums of money are required for R & D investment. IC became known as the core of industries because its field of use is multifaceted, and various demands have been made from the standpoint of higher integration, greater speed, lower power costs, etc.; in order to win markets with these achievements, it is imperative to ceaselessly conceive technological innovations. For this reason, R & D investments account for about 15 percent, which is a very high percentage, of the total IC sales.

Second, the semiconductor industry is an equipment industry which requires an enormous amount of investment in facilities. Many costly machines are needed, especially in IC production, and even in production facilities corresponding replacements are required because of the pace of technological innovations. For this reason, investments in facilities account for about 20 percent of the total IC sales.

Third, the sharp decline in prices can be cited. Differences exist due to the variety of goods, but generally speaking, because the principle of the proficiency curve can be applied to IC, a lower cost can be achieved by raising the cumulative production amount and using strategy to survive the competition. But even if large funds are invested resulting in development of a new type element, as soon as the product appears on the market, the price takes a sudden dip, and as a general rule, the total sum does not increase as much as the volume.

Fourth, the life cycle of the products is short. Because of the intense competition for development, as described above, in those fields where large markets are anticipated, such as for computer-use memory units, the life cycle is short because new products are successively produced. A typical example is the RAM (random access memory), in which the series of products moved up successively from a kilobit (a bit is a unit of information quantity, derived from binary digit), 4 kilobits and 16 kilobits, each with a life cycle of about 4 years, and the presently surging 64 kilobit product will probably last 4 years or less. Thus, because the tendency has been for the mainstay products which required large development costs and investment in facilities to have a short life cycle, it must be said that the financial load shouldered by private enterprises has been extremely heavy.

As described above, the semiconductor industry is an important industry that supports the foundation of Japan's industries, and because private enterprises, in particular, have shouldered the heavy burden of both capital and human resources, the government has implemented various policies in order to aid their promotion.

In line with ranking semiconductors as an essential industry and to determine its future course of action, the semiconductor industry was included in such action as the furnishing of low-interest loans for investment in facilities, as well as in such legislation as the Law on Temporary Measures To Promote Electronics Industries in 1957, the Law on Temporary Measures for Specified Electronics Industries and Specified Machinery Industries in 1971, and the Law on Temporary Measures To Promote Specified Machinery and Information Industries in 1978.

From the standpoint of technical development, it is one of the industries listed to receive assistance in the sustem to subsidize R & D expenditures in essential technologies, and assistance is also rendered as a computer-related industry. In concrete terms, in order to deal with the liberalization of computer imports and capital, the system to subsidize promotional expenditures to develop electronic computer and related industries was implemented from 1972 to 1976, and subsidies for IC development were granted in 1973 and 1974. During the 4-year period from 1976 to 1979, the subsidies granted for the technological development of VLSI for use in the fourth generation computer led by a joint research team of the five major companies achieved tremendous results, and high praise has been lavished at home and abroad. Following this, within the development of a high-speed computer system for scientific technological use which began in FY-81, developments have been underway on HEMT using gallium arsenide and on the new high-speed logical element called Josephson's element, from which excellent results are anticipated.

In addition, the system for R & D of technologies as the foundation for the next generation industries inaugurated in FY-81 with the aim of establishing the industrial base technologies of the 1990's has as goals the development of a super grid element, a three-dimensional circuit element and an environment-proof reinforced element; the emergence of totally new original elements is anticipated.

IC and International Relations

As for international relations, various measures were carried out in order to secure the domestic market in the infant stage of Japan's semiconductor industry, but today the importation of foreign capital and technology, as well as other matters, have been liberalized so that the domestic market is left open. Sensitive areas exist in international relations regarding IC, but basically, especially with the United States, it is believed that there is no basis for trade friction problems.

Regarding the interchange of technology and capital, a spirited interchange internationally is seen in the various fields of the semiconductor industry. In the beginning, technological interchange began with a one-sided importation by Japan, but along with Japan gaining technological power, its contributions increased and today a cross-license system exists, principally between the United States and Japan; with the mutual use of technologies, a higher order of R & D and smooth production operations are realized.

Even with the interchange of capital, Japan's major semiconductor manufacturers are actively involved in overseas investments; they have not only established market bases in the United States, Europe and Southeast Asia, but they have also constructed production bases. For this, they have employed local labor in the manufacturing and other functions, and they have made a large contribution to the host countries with their installations. On the other hand, foreign enterprises have accomplished a great deal in advancing into Japan by way of acquiring Japanese markets, utilizing stable Japanese labor, etc., and among them is Texas Instruments, the world's largest semiconductor manufacturer, which has established four factories in Japan with excellent performances in the manufacture of sophisticated products. Thus, a vigorous interchange of technology and capital is being undertaken internationally in the semiconductor industry, and it can be said that from the standpoint of international cooperation, Japan is playing a leading role.

But even with this sort of environment, it was not possible to avert trade friction with a sophisticated technology discipline such as the semiconductor. As for the trade balance in semiconductors between the United States and Japan, until recently Japan had an excess of imports, but today it is almost a balanced situation. Overall it has progressed up to now without problems, but regarding the classification by grade of goods, Japan's 16 KDRAM accounted for about 40 percent of the U.S. market. The 16 KDRAM is a computer-use memory unit for which a huge market is anticipated hereafter, and because it is a pivotal premium item even among the

IC types, Japan's rapid assumption of leadership in this field posed a threat to the U.S. semiconductor industry, resulting in a political problem. In essence, it resulted in the requirement that Japan's market be opened by an early reduction to the final duty percentage (4.2 percent) at the Tokyo round, regarding duty on semiconductors, but on this aspect, considering the importance of maintaining and expanding free trade in the field of semiconductors, agreement was reached between the United States and Japan on 30 September 1981 for both parties to enforce early reduction during FY-82. With this action, both the United States and Japan will offer the most open markets in the world.

As described above, as far as the semiconductor industry is concerned, whether in technology interchange, investment interchange, or trade balance and duty, none of the issues contains any basic problem and the plan for a smooth trade promotion hereafter is anticipated. However, the development tempo of one phase of America's industry, particularly the sophisticated field, has been revealed to be in a lagging state when compared with Japan, and it cannot be denied that this condition can be fueled as a political issue and turn into a problem of trade friction. Serious attention must be given to this point.

The Present State and Policies of the World's Semiconductor Industries

United States

As the parent developer of the semiconductor element, the U.S. semiconductor industry enjoys a huge market, domestically accounting for about half of the world demand, and it has consistently been the world leader in the semiconductor industry. Although some quarters report that Japan has caught up recently, with respect to the power to develop new products, design technology, etc., the United States still has the capability of being number one in the world.

Ranking first in the world in semiconductor production is Texas Instruments, followed by Motorola, and including these two companies, many of the U.S. manufacturers have established marketing and production bases abroad. The IC shipments for all of the U.S.-affiliated companies totalled about $6.4 billion in 1980, to supply 68 percent of the world IC demand.

America's IC imports totalled about $2.8 billion in 1980, or 56 percent of America's domestic demand, but geographically an overwhelming total, 32 percent, was from Malaysia, Singapore and the Philippines combined. This is because recently U.S. manufacturers have established in Southeast Asian countries assembly plants which require laborers, and they have taken steps to return these assembled finished products to the United States. Incidentally, IC imports from Japan constituted 6.3 percent of America's IC demand in 1980, and among them were supply units for the United States made by U.S.-affiliated companies, such as Japan Texas Instruments.

It goes without saying that technological development in the United States is vigorously undertaken by private industries, but huge sums of capital for development have been invested in large government projects in military, space and other areas. Recently the Department of Defense undertook a development project which is similar to Japan's VLSI development subsidy system, and it has projected the development of the VHSIC (very high-speed IC) with an investment of about $200 million during the 7-year period 1980 to 1986.

With the exclusion of in-house manufacturers, such as IBM and WE, the U.S. semiconductor industry can be classified into two groups; the small-medium and middle bracket "venture business" groups, such as Intel and Mostek, which are concentrated in the Silicon Valley region, and those that are independent of Silicon Valley such as TI. Of these, the "venture business" groups in Silicon Valley have received entrepreneurial benefits from new products derived from their ingenuity, but the trend is gradually moving in the direction of mass production and application with the attendant requirements of large capital funds and marketing strength. For these reasons, attention will be centered on the countermeasures to be projected by Silicon Valley hereafter.

There is no denying that the semiconductor industry in Europe has the appearance of lagging behind those of the United States and Japan. The major manufacturers are Siemens and Phillips, while the others are either U.S.-affiliated companies or joint venture enterprises. Europe's IC demand in 1980 was estimated at about $1.9 billion, of which about $1.5 billion was believed to be European shipments from U.S.-affiliated companies. Classified by country, IC demand was listed as 37 percent by West Germany, 21 percent by Britain and 15 percent by France, or a total of 73 percent accounted for by the three countries.

Semiconductor technology, especially IC technology, has made rapid progress, but because an enormous amount of human and financial resources are required, a great deal of time and manpower will be needed if the European manufacturers are to catch up with U.S. or Japanese manufacturers hereafter.

Future Outlook and Tasks

If the semiconductor industry is to progress to assume the nuclear role of truly supporting the foundation of Japan's industries, it is of paramount importance that it endeavor to step up its technological developments. Heretofore, the pattern has been basically to import items developed by U.S. manufacturers and to produce improved goods; in other words, consumer evaluation was based on superior quality management which was rooted in quality labor, and market acquisition resulted. However, should Japan further increase its competitive strength and assume a significant influential role internationally, and limiting itself only to those factors, then international friction will occur frequently hereafter and a substantive settlement cannot be achieved. To this end, the subject of elevating the world's semiconductor technology by emphasizing basic research and developing new elements with originality, thus contributing to the making of new products, is extremely important.

The idea of seeking coexistence with the rest of the world is considered essential from the standpoint of seeking the harmonious progress of the industry, but for this, it is necessary to seek progress in internationalization from the standpoint of industrial cooperation. In this case, there are limits to the form, extent, etc., of cooperation by private industries, but to that end, a long-range view is desired. A number of semiconductor manufacturers has already been involved in on-site production, but seeking wide countermeasures in capital investment, technology contribution, third-country cooperation, etc., is anticipated hereafter.

As for demand, IC is used in standard products and customized products, and the bulk of today's production is in standard products. IC makes possible the miniaturization and multifunctional use of electronic equipment and it promotes mechatronics by its merger with machinery, and because of this, the fields of IC application will widen more and more hereafter and the trend is for fulfilling diverse needs. But because the emphasis is on a variety of goods with small production, today only a number of the medium-class manufacturers are fulfilling the demand, and a wide area of needs is left without fulfillment. In order to contribute to society in its entirety with the wide use of IC hereafter and the making of new equipment, it is essential that the semiconductor industry fulfill the need for custom IC through serious examination and execution.

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U.S. SILICON VALLEY SEMICONDUCTOR PRODUCTION ANALYZED

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[Special report: "Industries of the World--Electronic Equipment": Article by Yuji Kiyokawa, consul at the Japanese Consulate-General in San Francisco]

> [Text] The technicians of Japanese companies in Silicon Valley watched the space shuttle launched gracefully into space and returned to the United States without any trouble, and they were made aware once again of America's electronic industry technology, especially the greatness of its sophisticated software.

Three staff members of an electronics company operating in a Middle Eastern country, a Frenchman, a Japanese and an American, were to be shot to death on a spying charge, and each was asked to voice his last wish. The Frenchman wished to sing La Marsellaise. The Japanese coolly stated his wish to give a speech on the ways of quality management, upon which the American shouted that he wanted to be shot first, before the Japanese spoke proudly on quality management which was for future generations! This is a joke written by Prof William Ouchi, writer of the book, "Theory Z," who was introduced recently in the prominent newspaper SAN JOSE MERCURY of Silicon Valley, and it is a meaningful joke to those recently connected with the electronics industry in America.

The total production of semiconductors in the United States is reported to be about $10 billion, and large production centers are located in the outskirts of Dallas, Texas, and the outskirts of San Jose, California, with the former popularly called Silicon Plain and the latter Silicon Valley. To the Japanese, the word "valley" suggests a picture of steep mountains and deep valleys with spring water from rocks flowing through, but to the large-scale Americans, who refer to Kyushu as Silicon Island, a large plain bordered by low mountain ranges in front and back is called a "valley."

Silicon Valley is a popular name given to the entire area in Santa Clara County, centering around Stanford University, which is about 80 km south of San Franciso; the 1,000 IC-related companies, both large and small, concentrated in this area produce about half of the entire U.S. output. A great many of the giant electronic industry related companies, such as Lockheed and Hewlett-Packard, are located here, and the area ranks as the seventh largest industrial zone in the entire United States.

There are two reasons which account for the emergence of this huge electronic industry complex called Silicon Valley in this region. The first reason is Professor Thurman of Stanford University. Before World War II, he lamented the fact that the graduates all went to the East to seek employment, and his encouragement to them to establish "venture business" in the vicinity of the university was the beginning. For example, soon after graduation, young Hewlett and Packard responded to the encouragement, and in the beginning started their work modestly in the garage which is the origin of the world-famous Hewlett-Packard Co. The semiconductor technology at the outset began in the East, but Fairchild in Silicon Valley established it as a modern industry, and many of the executives of the principal companies in Silicon Valley today left Fairchild and established independent companies. Professor Thurman, who is still healthy, is called the "father of Silicon Valley." The second reason is the favorable natural conditions, such as cheap land prices, open area suited for industrial purposes and excellent weather with little rainfall. And especially for a topnotch technician to fulfill his dream of the future while enjoying a "quality life," it was essential that he be offered the opportunity to absorb knowledge of sophisticated technologies (at Stanford University), for job transferral and for the convenience of establishing "venture businesses" (with the headquarters of the many private companies), and indeed this became a heaven-sent land. In this manner, the valley still has ample possibilities for success in the future, and in fact, it is one of the few American "frontiers" with success stories abounding regarding the many "venture businesses." This is the land where not only Professor Thurman, but also Mr Hewlett and Mr Packard must be mentioned in the history of semiconductors, as well as builders of the valley rich in their individualism, such as Mr Noyce, Mr Moore, Mr Sanders, etc.; and then we must mention Mr Hiroe Nagafune, called the "father of Japan's semiconductor," and others, who have exerted all their energies to compete for innovations in the most sophisticated technologies and to succeed in their tasks with their devotion to ingenuity.

The Present State of the Semiconductor Industry

As is generally known, semiconductors, especially the recently discovered IC (integrated circuits, or chips as they are called in the valley) are components filled with circuits of several tens of thousands of vacuum tubes, placed on an area the size of the fingernail tip of the little finger; these were urgently requested by the U.S. Air Force and space officials for their small size and light weight. Just as reportedly almost all of the IC products mass-produced from 1961 to 1963 were purchased by the military and space agency, even today it is said that high-grade chips are indispensable for the latest weapons, such as the cruise missiles; it is difficult for outsiders even to guess at the facts of military-related activities because of the shroud of secrecy. To expand on this last aspect, there are frequent reports on incidents of Soviet spying on technologies and of smuggling to communist bloc countries. It is reported that late last year the police and FBI launched an investigation into the theft of chips valued at about 600 million yen which were to have been delivered from Monolithic Memory Co to the Department of Defense and other agencies. At the same time, in the field of civilian goods, IC is called the "core of industries" and the "crude oil of future society"; by its incorporation into computers, office appliances, robots, automobiles and all types of machinery and equipment, it has assumed the principal role in the "information revolution" or the "second and a half industrial revolution."

The world semiconductor demand for the past 10 years, up to 1980, has continued to expand at a rate of increase of more than 20 percent per year. Along with the advances in miniaturization and cost reduction of semiconductors is the accelerated expansion of the electronic industry as users, and the scale of the world's electronic industry is expected to expand from $140 billion (about 31 trillion yen) in 1978 to $500 billion (about 110 trillion yen) in 1988, thereby attaining a scale that would rank alongside the petroleum and automobile industries, and for the semiconductor industry alone a scale of $50 billion (11 trillion yen) is forecast by the end of the 1980's. (A. D. Little Co)

Because of the many technical problems in the preparation of statistics on semiconductor production and consumption, it cannot be a complete accounting, but for all practical purposes, Table 1, prepared by the Semiconductor Industries in America (SIA), gives a global view of semiconductor production and a breakdown of consumers. According to this table, the value of U.S. semiconductor production in 1980 was $10.2 billion (2.2 trillion yen), of which less than 35 percent was exports, but because imports from Japan and other countries were included, its domestic consumption was $8 billion. Against this amount, the value of Japan's production was $3.6 billion (about 800 billion yen), which is about 35 percent of that of the United States; the figures also reveal that Japan's production scale slightly exceeds America's semiconductor exports of $3.9 billion. Considering that over half of America's semiconductors are produced in the valley, then the number of semiconductors produced in the valley far exceeds the total production for Japan. A listing of the principal companies in the valley and their shipping totals is shown in Table 2. There are some questions regarding the figures for Japanese companies listed in the table, but for comparison purposes, the figures are given in order to coordinate the data base. Regarding the U.S. semiconductor industry, outside the valley, the two preeminent companies are Texas Instruments and Motorola, and one can discern the industry structure with the presence of many mainstay companies in the valley. (Although IBM is the world's largest IC-producing company, it is not included in the table because its IC are utilized in its products and are not marketed outside.) With the enormity of the valley's electronic industry as a background, California accounts for 13 percent of the advanced technicians and scientists in United States, 20 percent of the electronic industry workers, 26 percent of the workers related to producing electronic computers and 35 percent of the semiconductor industry workers.

Table 1. World's semiconductor production and consumption matrix (1980)

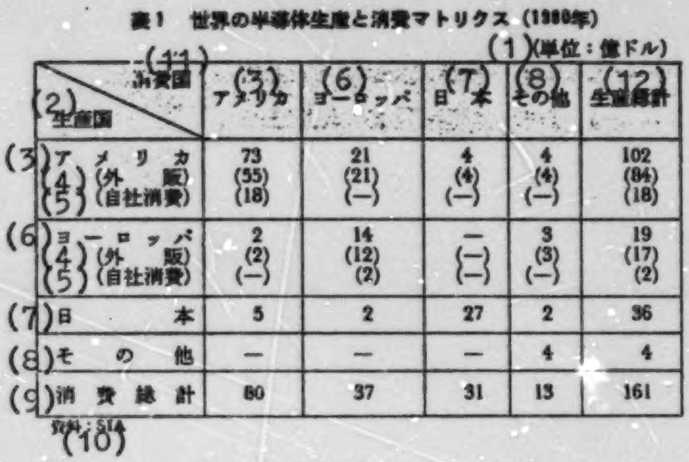

表1 世界の半導体生産と消費マトリクス（1980年）

(1)（単位：億ドル）

(2) 生産国 ＼ (11) 消費国	(3) アメリカ	(6) ヨーロッパ	(7) 日本	(8) その他	(12) 生産総計
(3) アメリカ (4)（外販） (5)（自社消費）	73 (55) (18)	21 (21) (—)	4 (4) (—)	4 (4) (—)	102 (84) (18)
(6) ヨーロッパ (4)（外販） (5)（自社消費）	2 (2) (—)	14 (12) (2)	— (—) (—)	3 (3) (—)	19 (17) (2)
(7) 日本	5	2	27	2	36
(8) その他	—	—	—	4	4
(9) 消費総計	80	37	31	13	161

資料：SIA (10)

Key:

1. Unit: $100 million
2. Producing countries
3. United States
4. Marketed
5. Used by own company
6. Europe
7. Japan
8. Others
9. Consumption total
10. Data by SIA
11. Consuming countries
12. Production total

Table 2. Semiconductor shipping totals for Silicon Valley and Japan's major companies

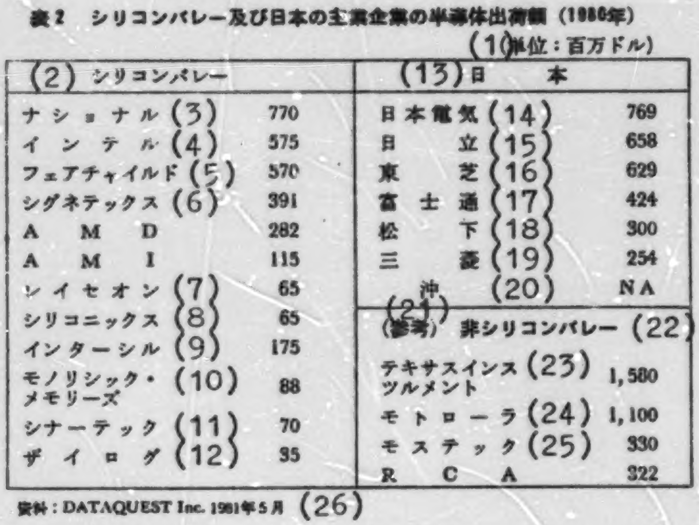

表2 シリコンバレー及び日本の主要企業の半導体出荷額（1980年）

(1)（単位：百万ドル）

(2) シリコンバレー		(13) 日本	
ナショナル (3)	770	日本電気 (14)	769
インテル (4)	575	日立 (15)	658
フェアチャイルド (5)	570	東芝 (16)	629
シグネテックス (6)	391	富士通 (17)	424
AMD	282	松下 (18)	300
AMI	115	三菱 (19)	254
レイセオン (7)	65	沖 (20)	NA
シリコニックス (8)	65	(21)（参考） 非シリコンバレー (22)	
インターシル (9)	175	テキサスインスツルメント (23)	1,580
モノリシック・メモリーズ (10)	88	モトローラ (24)	1,100
シナーテック (11)	70	モステック (25)	330
ザイログ (12)	35	RCA	322

資料：DATAQUEST Inc. 1981年5月 (26)

[Key on following page]

Key:

1. Unit: $100 million
2. Silicon Valley
3. National
4. Intel
5. Fairchild
6. Signetics
7. Raytheon
8. Siliconix
9. Intersil
10. Monolithic Memories
11. Synertek
12. Zilog
13. Japan
14. Nippon Electric Co
15. Hitachi Ltd
16. Toshiba Corporation
17. Fujitsu Ltd
18. Matsushita Electrical Industrial Co Ltd
19. Mitsubishi Electric Corp
20. Oki Electric Industry Co Ltd
21. Reference
22. Not in Silicon Valley
23. Texas Instruments
24. Motorola
25. Mostek
26. Data by Dataquest Inc, May 1981

Distress in the Valley

In the past, America's semiconductor industry achieved an annual growth of more than 20 percent, but starting in the latter half of 1980 it has experienced a slump in demand resulting in overstocking due to users paying unusually high interest, a decrease in demand for civilian goods such as electronic games, a sharp decrease in prices, etc. At the end of 1980, it was estimated that the bottom of the slump would occur in the first quarter of 1981, and Rosen Research, a leading survey company, predicted that the shipping volume in 1981 would be 5 percent lower than in the previous year and that the shadow of the slump would be strong for the succeeding period. Even recently the prevailing view has been that it would be unreasonable to expect a recovery of business in the first quarter of this year. As a result of the slump, the various companies in the valley have curtailed operations and enforced compulsory leavetaking in a mood of depression. During the previous slump, in 1974, layoffs and reduction in investment in facilities occurred, and the result was a bitter experience, for with the turn to good times the lack of supply power led to the advance of Japan-made semiconductors into the U.S. market. And so with this slump, because the various American companies have avoided laying off and have continued to invest in facilities, taking a long-range view even without a forecast of the future, the press has asked: "Are those in Silicon Valley heroes or lemmings?" (creatures who blindly drive themselves to suicide). But finally, in late October of last year, it was sensationally reported that the AMD subsidiary company, Advanced Microcomputer Co, made the bold move of laying off 193 employees, and other companies postponed plans to invest in facilities or took action to reduce operations. The unusually high interest rate in the United States began dropping in the latter half of 1981, but the economic situation overall has taken a turn for the worse, and it is feared that the semiconductor industry will undergo a deeper slump in the future.

Japanese Companies in the Valley

Because of the deep economic and cultural ties between the United States and Japan and with the valley being the center of the U.S. semiconductor industry, the valley has become the most suitable place for transportation and communication with Japan, for which reason most of Japan's semiconductor companies have engaged in production and operations here. With the exception of the oldest firm, Roma Co--formerly the Toyo Electrical Manufacturing Co, a middle-ranking IC manufacturer which in 1971 established the Exar Co (president; Kenichiro Sato) in the valley for semicustom IC production and which has a successful 10-year history, a labor force of 300 employees and sales of $25 million--the history of Japanese companies in the valley is comparatively new. The Nippon Electric Co Ltd has its NEC Electronics Co (president, Hiroe Nagafune) in the valley as its base for all U.S. operations and the Electronic Arrays Co (purchased in 1978) as its production base. At the time of purchase, the labor force was 289 employees and the sales total was $15 million, and it was not a sure profitmaker, but today with 400 employees and a sales total of $40 million, it has improved to a state of being profitable. The company's basic policy is to strictly remain an American company that will contribute to its regional society and that will produce locally more than half of the Nippon Electric sales items for the American market. As a part of its long-range plans, its second factory will be located in the so-called second Silicon Valley. The company announced last year that it would build in Roseville, situated on the outskirts of Sacramento, with an investment of $100 million, and ultimately it intends to build a factory that will not be inferior to the company's plant in Japan. The Toshiba Corporation in 1980 purchased the Maruman Integrated Circuit Co, an enterprise of Americans of Japanese descent, and renamed it the Toshiba Semiconductor Co. After about 1 and 1/2 years of expanding its scope and increasing its personnel, its labor force has increased from 230 at the time of purchase to the present 380. It is ready to operate smoothly under the strong leadership of President Kenji Takahashi and it expects to ship annually a total of about 10 billion yen worth of goods, all to be delivered to Toshiba America Co. The company already has become an integral part of the valley's semiconductor community and as the occasion arises, it has engaged in the mutual use of facilities with American semiconductor companies. In contrast to these three companies being located in the valley, the Fujitsu Microelectronics Co (president, Matami Yasufuku; vice president and executive officer in America, Yutaka Sugiyama), although it has plans to have its base of operations in the valley, in 1979 began the construction of an IC factory with a capital of $10 million in San Diego, near the Mexican border, and in June 1981 it held the factory's inauguration ceremony. At the outset, the factory had a labor force of about 150 employees, but in 1 or 2 years the company expects to increase it to about 400. By producing in America all that it intends to sell on the U.S. market, the company strongly hopes to contribute to solving the problem of IC trade friction.

Besides the above companies in the valley, Japan's major semiconductor companies, such as Hitachi America (business manager, Eiji Kogu), Mitsubishi Electronics·America (business manager, Rempei Tsuchiya), Oki Electric (office manager, Tatsuo Ishihara) and Sanyo Semiconductor (business manager, Tsuyoshi Taira), have successively established operational bases and other facilities, and the extent of increase of Japan's semiconductor related companies is so great that recently the NEW YORK

TIMES referred to the grouping as "California Tokyo." In this respect, the advance of American semiconductor companies into Japan has followed practically the same pattern, and it can be said that it is in a transitional stage from a simple trade relationship to one of mutual extension. And the actual status is that, while there is an intense competition between the semiconductor companies of the United States and Japan, at the same time there is procurement from a rival competing company if a superior semiconductor is developed, and as some reporters have described it, it is not a simple relationship where competing rivals cannot exist alongside each other.

Such a manner of writing may convey the impression that everything is progressing satisfactorily, but the truth is that all the companies are struggling through difficulties. In 1977 and 1978, not only the local papers but even FORTUNE magazine carried unpleasant illustrations and articles, entitled "Japanese Spies in Silicon Valley," as if there were a "U.S.-Japan Semiconductor War," and as will be described later, various efforts were exerted in order to reach the present state. Even with plant management in America, in an operational environment that differed in every respect from that of Japan and of hiring practices that differed and were symbolized by a high rate in change of occupations, there was a process of trial and error in establishing better mutual understanding from unfamiliar English spoken by employees of various ethnic backgrounds. Moreover, the children of employees sent from Japan encountered difficulties; even after study, upon returning to Japan, the system to receive the student returnees was in name only and often there were no guarantees regarding the future of the children, thus leading to lowering the morale of the employees. Besides, the unitary tax (the aggregate tax system) of California recently has become a big stumbling block to investments in America and has been viewed as becoming an increasing problem. Although these various companies, enduring hardships too numerous to mention, along with Consul General Hiroshi Kitamura are doing their best to dissolve any trade friction and to dispel any misunderstanding toward Japan, by taking up the problem elsewhere and without visiting the area directly, a leading Japanese newspaper made an unfounded report to the effect that "intertwined with the valley's semiconductor problem is the stoning of Japanese children," which greatly angered those concerned. Considering the history of the rejection of Japanese immigrants from California as one of the remote causes [as published] of World War II and considering the fact that racial discrimination today in the United States is prohibited by law, it goes without saying that with this sort of sensitive problem, judicious reporting based on facts is desirable.

U.S.-Japan Semiconductor Relations

The U.S.-Japanese relations in the semiconductor industry at present are in a lull. The sharp charges against the Japanese, principally by the SIA around 1978, were spectacularly reported as the "U.S.-Japan semiconductor war," but, although the 14 December 1981 issue of FORTUNE magazine reported that the Japanese companies account for 69.5 percent of the world's share in the production of the 64 K RAM and that Silicon Valley has been far outdistanced by Japan in sophisticated technology chips, the article is very objective and scientific, written with dignity when compared with the yellow journalism of the former spy accounts.

The biggest reason for the present state of stability in U.S.-Japan relations is believed to be the move for the early tariff reduction on semiconductors announced by Prime Minister Suzuki during his visit to the United States in May of last year. It was agreed at the Tokyo round negotiations that the semiconductor tariff (12 percent for Japan and 6 percent for the United States) of both countries would be reduced to 4.2 percent in 1987, but because of the conspicuous rise subsequently in the competitive strength of Japan's semiconductor industry, cries of opening Japan's markets without delay by lowering the tariff were raised principally by the SIA, and this became the SIA's major demand with regard to Japan. However, Japan quickly accepted the demand and agreed to reduce the tariff starting early this year to 4.2 percent for the United States (4.2 percent also for next year) and 4.2 percent for Japan. (Europe has maintained its high tariff of 17 percent, and both the United States and Japan are asking Europe to follow suit in the move for reduction.) It was deduced from press accounts that Prime Minister Suzuki's announcement on the move for early reduction was greeted with favorable comments, but now that trade barriers have been removed, with Japan accepting SIA's demand to open up markets, whether the Japanese market can be penetrated will depend on the amount of effort expended by the individual companies hereafter. Another point that must be observed is the "quality management seminar" that was sponsored by the Electronic Industries Association of Japan in Washington, D.C., in the spring of 1980. At the assembly, Hewlett-Packard Co, a giant user of semiconductors, revealed a comparison of results of tests with both U.S. and Japanese semiconductors, and the fact that the quality of Japanese semiconductors was reported to be remarkably superior not only served to sweep away the image that the market share was gained by dumping exports of Japanese goods, but it became the opportunity to establish an image that "Japan equals quality management," which was the crux of Professor Ouchi's joke mentioned in the opening paragraph. Also, a joint research into the U.S.-Japan semiconductor industries, led by Professor Takuo Sugawara of Tokyo University and Professor Linville of Stanford University, was conducted for nearly 2 years with many scholars and researchers recruited from the United States and Japan. It is noteworthy that the course of this slow but sure research did not stop simply at semiconductors, but went into survey and research on such broad fields as the politics, economics, financial systems, tax systems, industrial fields, etc., of both countries, and it is believed that it is an invaluable asset for the future.

In addition, as a more basic issue, one cannot overlook the fact that, because U.S. semiconductor companies have invested in Japan and engaged in production leading to an increase in the number of cases of exporting the products to the United States, any criticism of importing semiconductors from Japan in essence is a criticism of American companies. The increase in American companies investing in Japan hereafter should all the more reduce the feeling of dissatisfaction by American companies on the trade issue. But it should be noted that investments by private companies in Japan will inevitably lead to a greater demand for equal treatment with Japanese companies, or treatment like a native company, from the standpoint of Japanese Government measures; theoretically, the demands will get greater, just as the U.S. banks in Japan are currently demanding not only "no discrimination" treatment from the government domestically but also reciprocation in all aspects of the treatment granted to Japanese companies in the United States.

At any rate, the present demands on Japan by the SIA, organized by the valley semiconductor manufacturers, are twofold. First, as mentioned in the report of the U.S.-Japan Wise Men's Group, the early reduction of the semiconductor tariffs of the United States and Japan to 4.2 percent, the abolition of the tariff on technologically sophisticated industries in the future, and the granting of equal treatment as pertains to governmental R & D plans and government procurement. (The extent of these two aspects is described in the report containing the requests by SIA to the Wise Men's Group.) Second, the SIA's plan to have Japan cooperate in compiling semiconductor trade statistics inclusive of the United States, Europe and Japan.

The Latent Power of the United States.

American journalism for the past year has played up Japan's overwhelming superiority in production technology by describing the high reliability and superior quality management of Japan's semiconductors and the advanced 64 K RAM. But the technicians of Japanese companies in the valley had a firsthand observation of the smooth launching of the space shuttle "Columbia" with complete computer control and its return to America with no problems whatsoever, and were made aware once again of the might of America's electronic industry technology, particularly its superior software. Furthermore, in 1978 the Department of Defense announced an R & D plan for VHSIC that would have a speed and capacity 100 times that of today, and work has been underway since 1981. This sort of military technology falls in the realm of defense secrets, and outsiders cannot even guess at it, but it is clear that in time the results will become commercial spinoffs. Contrary to some reports, the members of the U.S. electronics industry are deeply confident of themselves. Although Japanese companies excel in some varieties of semiconductors, the United States has overwhelming superiority in semiconductors as a whole, and actually there has been no change in its market share in the world. A good example is Motorola Co, which ran a series of "testimonial" advertisements entitled "Responding to Japan's Challenge" in the major trade journals starting last August, and in them it gave concrete explanations of the company's excellence in the American way of life today, even when Japan has outstanding electronics products, and it served to stir up the various American companies.

The semiconductor industry is an industry of rapid technological innovations and at the same time one in which the benefits for the innovator and benefits regarding scale are very marked. According to the "Theory of the Running Curve" which has been adopted by Texas Instruments, if the production volume is doubled, the cost is reduced by 27 percent. In other words, if the production volume of semiconductors, which presently is in a state of balance in income and expenditure, is doubled, a profit of 27 percent will be realized, but once a new technology is brought into mass production by the innovator, it is impossible for the subsequent producing company to compete regarding cost, and in fact it cannot enter the market. This theory emphasizes that in business competition the size of operations determines the winner, and today in the valley, with the exception of a few, the medium-size companies have been abosrbed by giant companies during the past few years. With this sort of trend in the semiconductor industry, surviving as the leaders in the semiconductor industry in the future will be five or six companies throughout the world, while the others may continue only as custom manufacturers fulfilling orders with specifications requested by a client, in the opinion of some influential quarters.

Challenging technological innovations is essential in order to survive, but Americans believe that because of the differences in culture, education and business operating methods between the United States and Japan, the Japanese can absorb ideas and have the capacity to excel in thorough production, whereas Americans can tinker with original ideas and excel in developing innovations. The counterargument that the purchase or other disposition of patent rights and knowhow in the course of catching up technologically can be considered in this sort of discussion, but in any case, whether the perception on the cultures of the United States and Japan is right or not will probably be known as a fact in the very near future.

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POLITICAL AND SOCIOLOGICAL

NEW LIBERAL CLUB'S TAGAWA VOICES CRITICISM OF TANAKA

Tokyo ZAIKAI in Japanese 23 March 82 pp 116-117

[Article by Ichiro Ushio: "The New Liberal Club's Savant Who Showed Manly Character in the 'Tanaka Criticism'"]

[Text] Tagawa Boom in the Political Arena

A small "Tagawa boom" is now occurring in the political arena. In an address delivered at the New Liberal Club fifth annual convention held in February, Mr Tagawa criticized by name former Prime Minister Tanaka, who, as leader of a large corps of 109 members, not only possesses the greatest influence on the Suzuki administration but also controls the LDP by having obtained the post of secretary general for his faction. "If a politician is convicted in the first instance in the Lockheed trial, it is only right for him to resign as a Diet member." Mr Tagawa has given Tanaka "advice to resign."

Mr Tagawa has said that "politics influenced by a defendant in a criminal case are not good" on various occasions such as party meetings, in speeches, or in press conferences with political reporters. However, this was the first time for him to make a criticism by specific name at an official party function such as the annual convention.

As the Tanaka corps has been expanding greatly and Tanaka's influence in the Suzuki administration has become more obvious, LDP factional leaders have been remaining silent with an eye toward "the next political power." Because Diet members are afraid of the power of former Prime Minister Tanaka and his faction, they are saying nothing about the Lockheed trial. This is the situation. Even Mr Takeo Miki and Mr Takeo Fukuda, who used to be the sharpest critics of plutocracy, say at the most: "One faction's expansion has reached an intolerable stage. If a faction becomes a party within the party, the party's order as a public party will be disturbed" (Mr Miki). Or, "Prime Minister Suzuki lacks eagerness for political reform" (Mr Fukuda). Their remarks are said to be "at most the howling of dogs" (an elder nonfaction member).

In the case of the opposition parties, as seen in the issue of the installation of fire control systems in F-4 Phantom fighters, the Komei Party has a close relationship with the Tanaka faction, while the Democratic Socialist Party has ties to the Fukuda faction and the Nakagawa group. For this reason, these two parties have rarely criticized Tanaka. The Socialist Party also lacks an ambitious spirit. Therefore, Mr Tagawa's speech impressed many people. Both the offices of the New Liberal Club and Mr Tagawa have been receiving encouraging telephone calls from unknown citizens who say: "Mr Tagawa's opinion is right, and we hope he will maintain that attitude hereafter." There was also a secretary of an LDP Diet member who called on the telephone and said: "Thank you, Mr Tagawa, for saying this."

Mr Tagawa said: "At the start we were disappointed by the LDP's plutocratic tendency as represented by Mr Tanaka and we left the LDP to found a new party. I said what was only natural to us." Nevertheless, he has been surprised by such a big reaction. "It shows that the Tanaka issue is a cancer for politics in the immediate future and that dissatisfaction is deeply rooted in the present political arena and among people" (a leading member of the New Liberal Club).

Behind the Scenes of Tagawa's Speech

Mr Tagawa's speech, however, was not made merely to emphasize the founding spirit of the New Liberal Club or criticize the distorted situation in the political arena. For the leader of the New Liberal Club, a shrewd calculation can vaguely be seen.

In the 1979 general election, the New Liberal Club was miserably defeated and declined from 17 to 4 Diet seats. After the defeat, then President Yohei Kono's confrontation with then Secretary General Takeo Nishioka over the party line became apparent. As a result, Mr Nishioka left the party. Then, local assemblymen left the party one after another. Local level organizations of the New Liberal Club were dissolved one after another. The New Liberal Club found itself in a pinch for the first time since the foundation of the party.

Because of that, Mr Kono resigned from the presidency and Mr Tagawa became the president. Although the New Liberal Club obtained 10 seats in the House of Representatives and two seats in the House of Councilors in the 1980 double election of both houses and regained some of its force, it still lacks the strength it had at the time of its foundation. While Mr Yohei Kono is still said to be "equal to the New Liberal Club," Mr Tagawa has industriously been visiting local members or trying to meet and communicate with young Diet members of the New Liberal Club. By doing so, he has somehow maintained the unity of the party.

However, there were still differences between Mr Kono (currently the deputy president) and Secretary General Toshio Yamaguchi as to whether the New Liberal Club should join the middle-of-the-road parties or remain a second conservative party. At the annual convention held in February the New Liberal Club presented the idea of "a Liberal National League" intended to converge the middle-of-the-road parties and the liberal faction of the LDP, and it definitely decided to depart from the idea of two conservative parties. There were still some members in the party who strongly insisted on the two conservative party idea which involved continued ties with the LDP, but Mr Tagawa persuaded them and decided to change the party line greatly.

Therefore, Mr Tagawa needed to expose the current condition of the LDP under the tight control of the Tanaka faction in order to split with the LDP.

Another reason is to establish leadership of the New Liberal Club among the middle-of-the-road forces. Of the middle-of-the-road Komei Party, Democratic Socialist Party, New Liberal Club, and Socialist Democratic League, the New Liberal Club is the third largest. At the time of the extraordinary Diet session held last fall, the New Liberal Club and the Socialist Democratic League founded a joint organ called the New Liberal Club Democratic League in the Diet. The reason for this was to bring their forces as close as possible to those of the Komei and Democratic Socialist Parties.

Mr Tagawa pointed out the weakness of both the Komei and Democratic Socialist Parties, which would not take any action concerning the Tanaka issue because of their ties with LDP factions, and impressed the significance of the New Liberal Club's existence on people both inside and outside the party by criticizing plutocracy. This will weigh heavily in the convergence of the middle-of-the-road parties hereafter. Criticizing plutocracy is not against the founding spirit of the New Liberal Club. Consequently, this can lead to a tie with a force that is critical to plutocracy within the LDP. For this reason, some are saying: "Mr Tagawa has become suitable to be the leader of the party. Today his maneuvers are wonderful."

Holds Key to Convergence of the Middle-of-the-Road Forces

Mr Tagawa has had a long career in the Diet. If he had stayed in the LDP, he would have held a cabinet post. When he was an LDP member, he worked hard to improve the Japan-China relationship before the normalization of diplomatic relations between the two countries in spite of severe criticism within the party. Even today, he is one of the Japanese politicians in whom Chinese Government leaders have the most confidence. However, Mr Tagawa has a quiet nature, and because of this he has been said to be unsuitable to be the party boss.

Mr Tagawa himself has repeatedly said that "the face of the New Liberal Club is still Yohei Kono." During the annual convention, there was speculation that Mr Tagawa would pass the position as party leader to Mr Kono.

However, his skilfulness in keeping the party united during 2 difficult years is highly regarded by young members. He has shown characteristics different from Mr Kono, who has always been a star walking down a sunny road.

Among the middle-of-the-road parties, people are saying that "he may become a leader of the convergence of the middle-of-the-road forces in the future." At present, Tagawa's stock is rising sharply.

When he changes his old attitude his old attitude of "going my way" without stepping into the limelight and has the spirit of positively involving himself in reorganizing the middle-of-the-road forces, he will be a man who holds a key to the convergence of the middle-of-the-road forces.

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POLITICAL AND SOCIOLOGICAL

DISAFFECTION OF NON-MAINSTREAM FACTION IN LDP EXAMINED

Tokyo KEIZAI TEMBO in Japanese 1 Apr 82 pp 14-17

[Text] The FY-82 budget was finally passed in the House of Representatives after many difficulties. During the budget debates, the confusion shown by the Suzuki administration was unbearable to watch. The view that Suzuki's reelection is hopeless has already spread inside and outside the LDP. In addition, former Prime Minister Miki, who had kept silent for a long time, sharply criticized the Suzuki-Tanaka regime at a meeting of the LDP's supreme counselors. Then, former Prime Minister Fukuda joined Miki. A shaking of the Suzuki administration from inside the LDP has been realized.

Former Prime Minister Miki is a strategist shrewd enough that it can be said that the start of a political change is always initiated by him. His speech has had an uncanny impact within the party. Some declare that "a dormant volcano has erupted. It certainly spread to the Fukuda, Komoto, and Nakagawa factions to cause a great earthquake disaster." It seems that Suzuki's reelection in November is very delicate. Some people whisper the theory of a political change in June. Former Prime Minister Fukuda's view of "great disturbances in the world" has been getting more realistic every day.

A Rough Supreme Counselors Meeting

This is a story a little out of date. The past 19 February must have been the most unpleasant day for Prime Minister Suzuki since his cabinet was inaugurated.

On that day, the LDP's supreme counselors meeting was held at the prime minister's official residence for the first time in 8 months. This meeting was established for the purpose of gathering together current LDP Diet members who are former prime ministers and speakers of either the House of Representatives or Councilors at one place to offer advice to the current prime minister. But, beginning with the meeting held on 19 February, former Prime Minister Nobusuke Kishi joined the group even though he has already retired from politics.

There are several reasons why Kishi, who is no longer a Diet member, was added to those attending the supreme counselors meeting. In the reshuffle of the cabinet and LDP officials at the end of the year, Prime Minister Suzuki changed his previous attitude of balancing between Fukuda and Tanaka and clearly tilted toward Tanaka. Former Prime Minister Fukuda was uneasy in his heart. Therefore, he tried to regain leadership within the LDP by making Kishi vice president of the LDP.

Suzuki rejected Fukuda's proposal and instead compromised with Fukuda by adding Kishi to the supreme counselors meeting. Although Kishi is Fukuda's former political boss and highly respected by Fukuda, Kishi is also said to be very close to Tanaka recently. Because the supreme counselors meeting has more pro-Fukuda members (Miki, Fukuda, Hirokichi Nadao, and Ken Yasui), Suzuki could correct the imbalance by adding Kishi, who also has a close relationship with Tanaka. Suzuki appears to have tried to make Kishi's addition serve two ends.

Moreover, because Kishi and Miki have been like cat and dog since the 1960 revision of the Japan-U.S. Security Treaty, Suzuki intended to give Miki a warning with the addition of Kishi. The meeting held on 19 February was called a "show with an all-star cast" for Kishi. But at this meeting Miki made a bombshell speech.

Miki's speech was well-prepared. He used carefully selected words, as is often the case in his speeches. But his speech also assumed an unexpected severity in criticizing Tanaka and his faction, which had been considered taboo.

"I really think your (the prime minister's) commitment to administrative reform is right. If you miss this opportunity, administrative reform can never be accomplished. In order to succeed, you need more than anything the people's support. A political party must be trusted by the people. If the ruling party does not reform itself, we cannot keep people's trust. On the contrary, what is the current condition of the factions? To be specific, one faction's expansion is at an intolerably large level. This faction's movement, which seems to point toward formation of "a party within the party," disturbs the order of a public party. There is an atmosphere in the party in which everybody refrains from speaking out of deference to the faction. Under these conditions, party vitality cannot be generated. Mr Kishi once said that elimination of factionalism was 'heaven's voice.' Mr Fukuda has also been trying to check the activity of factions. Right after your inauguration as prime minister, Mr Suzuki also had the party's Executive Committee resolve on the elimination of factionalism. However, recently, Mr Suzuki is tending positively to tolerate activities of the factions. This looks strange to the people, and criticism has been rising among them. I think that the prime minister needs to attend to the whole party system in a real sense. What do you think?"

To Miki's severe words, Susumu Nikaido, the LDP secretary general and alternate leader of the Tanaka faction, turned red and replied. Nikaido defended the Tanaka faction by saying: "Such is not the case. We are managing the party fairly." But it is true that the Tanaka faction has grown into an unprecedentedly large faction of 109 members, and the executive positions of the LDP are almost monopolized by the Tanaka faction. Consequently, the prime minister could do nothing but pass off the matter by smiling. Fukuda also offered his opinion of "party reform," and provided a scene to remind us of "the Miki-Fukuda tie" again.

Uncanny Movements of Komoto

Following Miki's speech was New Liberal Club President Seiichi Tagawa's address criticizing Tanaka at the New Liberal Club annual convention held on the afternoon of the same day. Tagawa shocked people by saying in a severe tone that "I am ashamed of even having a seat in the Diet together with Kakuei Tanaka, a defendent in a criminal case." Although there are conjectures that Miki and Tagawa conspired to criticze Tanaka, they are nothing more than conjecture.

At any rate, during the LDP's 40-day struggle at the end of 1979, the New Liberal Club supported Mr Ohira rather than Mr Fukuda in the prime ministerial election. Therefore, when the New Liberal Club, which has been thought to be tilting to the Ohira (Suzuki)-Tanaka line, publicly criticized Tanaka--something other opposition Socialist and Democratic Socialist parties could not do--it was shocking.

"Miki and Tagawa were right to say so. There has been nobody else around Nagata-cho [the location of LDP headquarters] who could speak the truth in a normal manner. They broke the taboo on criticizing Tanaka. Tanaka will be criticized at every turn hereafter. This will do considerable damage to Suzuki of the right-angle [the Japanese characters for a right-angle also mean "straight to the kaku" of Kakuei] cabinet" (a member of a neutral faction). "Fukuda could not clearly talk about extremely delicate matters because of Kishi. Nevertheless, he seemed mentally to agree 100 percent with Miki. Eventually my turn [to become a minister] will come" (a member of the Fukuda faction). There is someone who has already indicated Fukuda's movement.

Economic Planning Agency Director Toshio Komoto, who has kept a certain distance from Miki, remained at least superficially silent. At the general meeting of the Komoto faction held immediately after the supreme counselors meeting, there were many who supported Miki's speech. Diet Member Mitoji Sakamoto, who is rash, did not hesitate to speak publicly about "Komoto's resignation from his cabinet post in June."

Sakamoto said: "I advised Mr Komoto not to miss the timing in the deciding game, which would be in June or July. Then, Mr Komoto said that he understood well enough."

Komoto has recently been trying to contact the Fukuda faction. He has secretly been playing golf often with MITI Minister Shintaro Abe, the prince of the Fukuda faction, and Science and Technology Agency Director Ichiro Nakagawa, and improving his friendship with them. Moreover, in order to run in the LDP presidential election this fall, Komoto has been devoting all his efforts to gaining the support of party members in preparation for the primary election.

Komoto is quite dissatisfied with the Suzuki-Watanabe economic policy line of the Suzuki cabinet. Both Abe and Nakagawa have been showing their support for Komoto's economic policies, which place top priority on stimulating the economy. They started direct and indirect criticism of Watanabe's economic management, which is solely based on balancing the budget. How great their dissatisfaction with Watanabe's economic handling is going to grow depends on the prospective revenue deficit, which will be revealed in May or June. If the revenue deficit exceeds 1 trillion yen, Finance Minister Watanabe may have to resign. If Watanabe refuses to take responsibility and does not resign, it is quite conceivable that Komoto will resign from his cabinet post. If Abe and Nakagawa follow Komoto, it will clearly lead to "a political change."

Angry Provisional Administrative Research Committee Chairman Doko

In addition, an issue causing Suzuki headaches is the Paris summit in June. It is expected that the United States and Europe will harshly criticize Japan over the issue of trade friction. The Masumi Esaki economic mission was already sent to the United States as part of the Suzuki-Nikaido strategy line. However, as already reported by the newspapers, Esaki was asked in harsh tones by U.S. Secretary of Defense Weinburger and others to open the Japanese market and to increase Japanese defense spending; he was struck by them as if he were a sandbag, and he returned to Japan after a hard time in the United States.

This Esaki mission also provided a good opportunity for the anti-mainstream factions to criticize the bad timing of the mission's dispatch to the United States and the general lack of strategy in the Suzuki administration. Miki criticized Suzuki's lack of dimplmatic sense in the following way: "It is useless to list only Japanese assertions. If I were in his position, I would tell the United States that the Japan-U.S. relationship is indespensable to both countries, and if the United States is in trouble, Japan is also in trouble. After confirming mutual recognition of each other's position, I would say that Japan will yield what we can. So, I would ask the United States to indicate specifically what it wants Japan to do."

In other words, Miki means that Suzuki should talk frankly with the leader of the United States and settle the issue through "summit diplomacy." "In that sense, Suzuki lacks his own philosophy and principle of diplomacy" (a leading member of the Fukuda faction).

In addition, in April a verdict will be handed down to the politician defendants in the Lockheed trial, Tomisaburo Hashimoto and Takayuki Sato. At present, they are likely to be convicted. In such a case, since the taboo on criticizing Tanaka was broken by Miki and Tagawa, the opposition parties will give Tanaka "advice to resign."

Furthermore, if the name of Nikaido, who has been labelled "a gray high official," also appears in the verdict, Nikaido's label will at least politically change from gray to black.

At the same time, if Nikaido's political responsibility is questioned, depending on the situation, Nikaido may resign as the secretary general, and Deputy Secretary General Noboru Takeshita will be promoted to secretary general. If a secretary general is changed in midterm, it is an abnormal situation for the ruling party. This alone will inevitably shake the future of the Suzuki cabinet.

Moreover, an even larger fetter on the Suzuki administration is the report of the Second Provisional Administrative Research Committee. The recommendation for consolidation and abolition of central ministries and agencies will be included in the basic report scheduled for July. But the resistance of bureaucrats to this issue is strong and is expected to be a great obstacle to the Suzuki administration.

Considering these conditions, Administrative Management Agency Director Nakasone has advised Suzuki to separate the issue from the basic report scheduled for July. It was obvious that his intention was to postpone the report on this issue until after Suzuki's reelection. Consequently, Nakasone was counterattacked by the anti-mainstream factions of the LDP. However, one man who got even angrier was the chairman of the Provisional Administrative Research Committee, Toskio Doko, who has staked his old bones on administrative reform. "Suzuki cannot be trusted. After inveigling me with much flattery, he wants to put off the difficult issue. What is all this? First of all, to interfere with the schedule of the committee is out of the question. If he interferes with us again or shows any indication of sabotage, I will immediately resign as the chairman of the Provisional Administrative Research Committee." Thus, he angrily criticized Suzuki.

If Chairman Doko resigns, Suzuki, who publicly promised to stake his political life on administrative reform, will inevitably have to resign as prime minister. The anti-mainstream factions in the LDP are eagerly watching the situation, saying that "if Suzuki upsets Mr Doko, we cannot support the Suzuki administration any longer" (a leading member of the Fukuda faction). The prime minister seems to have been cornered into a situation where he cannot step back even one foot.

Dependent on Tanaka As Always

Various difficulties are in store for this year's political situation, in particular in the future of the Suzuki administration. Nevertheless, Suzuki's desire for reelection is fairly great. His only hopes are the Tanaka faction in the LDP and the Komei Party outside the LDP.

If the anti-mainstream factions resist, Suzuki will dissolve the Diet and have a general election at any time. If the anti-mainstream factions oppose the Suzuki administration, it will not hesitate to leave the LDP. These bullish strategies have been spreading through the Tanaka faction's underground radio to warn the anti-mainstream factions. Stated in reverse, the Suzuki administration does not have confidence in itself to tide over the political situation. Even if the prime minister decides to have a general election within the year, there are several reasons why he cannot actually have a general election.

One of the reasons is that the LDP cannot obtain abundant campaign funds from the business and financial world because of the serious recession. Another reason is that, since the 287 seats currently held by the LDP are the maximum number the LDP could win, the LDP is certain to lose some seats in the next election. There is no reason for the LDP to increase the number of its seats if there is an election this year.

In addition, the Tanaka side is spreading a rumor about leaving the party. But this is putting the cart before the horse. Reviewing the history of Japanese politics, it is improbable that the dirty faction would break with the party and leave the clean faction behind.

A new party will be founded only when Suzuki stubbornly seeks reelection, and the Tanaka faction concurrently approaches the Komei Party in search of a policy agreement to maintain its leadership in politics. It is clear to everyone that the future of the Suzuki cabinet will become more and more difficult.

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POLITICAL AND SOCIOLOGICAL

EFFECTS OF SCHISM IN SOCIALIST PARTY ANALYZED

Tokyo KEIZAI TEMBO in Japanese 15 Apr 82 pp 14-17

[Text] The depression of the Suzuki cabinet continues, what with the discord in trade relations between the United States and Japan, the rejection of tax reductions, and the like, and in all the public opinion polls support is at its lowest since the inauguration of the cabinet, with the percentage of nonsupport reaching about 50 percent. At such a time the main opposition party, the JSP, should be making a supreme effort to lay the basis for a transfer of power, yet it is only raising a slogan of "decisive political struggle in 83," while internally the party is fragmented. The ability of Chairman Asukata to govern is totally collapsing, and the disappointment of the populace is steadily deepening. Subject to jests like "Baba who?," the new secretary, Baba Noboru, is also depressed. They say: "We are not trying to fly with only the left engine; these are the labor pains of an emerging party of the whole people," which, as an excuse, is first class, but....

Secretary Baba Gets It From All Sides

The birth within the Socialist Party of a "single-engined executive, without the rightwing," occurred on 6 February.

At that time the sponsoring General Council of the Trade Unions of Japan (Sohyo), which had withheld recognition of the new executive of Chairman Asukata and Secretary Baba for nearly a month, froze all campaigning for the Socialist Party. Now, the members of the rightwing anti-Asukata factions, who refused to join the executive, seem ready to call an extraordinary party general meeting next fall to seek to change officeholders, placing the executive in limbo. The most rightwing elements of Sohyo, such as the All Japan Telecommunications Workers Union, are going so far as to threaten to reconsider support of the Socialist Party as long as the present situation continues.

Komeito (the "Clean Government Party"), which in January of the year before last agreed to a plan for joint political action, has suspended its provisional cooperation in the Diet and has refused meetings, not only of the party leaders, but even of the secretaries, and shows no signs of any plans to mend relations.

Within the Socialist Party some 60 percent of the Diet members belong to anti-Asukata factions, so it is fair to say that at the national level the administration of the party is paralyzed. The Asukata-Baba structure is under attack from three directions--from within the party, from Sohyo, and from the other opposition parties--and is in the situation of being unable to take any action.

However, the present chairman, Asukata, remains confident, saying: "My election was no mistake. The recent general meeting of the party was a success, and a most significant one." Secretary Baba calmly says: "Now we shall work for conciliation within the party and friendly relations outside."

The posture adopted by these two is as might be expected, but the rightwing does not join in. It is spreading plausible accounts such as: "They show no hint of reflection at all. When he was appointed secretary, Baba went home and got into bed and rejoiced to his family, 'Ah. I've finally made secretary,'" and anti-Baba sentiment is spreading.

For the rightwing, the worst aspect of the defeat in the chairmanship election was that it had urged from the start that it was necessary to transfer the posts of secretary and national chairman to the rightwing and establish a unified party structure.

However, not only was there no transfer to the rightwing, but an unknown newcomer like Baba was appointed, and the rightwing has counterattacked, saying: "The secretary is the visible face of the party. As he is inexperienced in either party or national affairs, he cannot hold his own in the struggle in the Diet or in the coming decisive political struggle of 1983." In Sohyo, too, Chairman Makieda has urged prudence on Baba, saying: "You are new as secretary of the party headquarters. You have just come up from secretary of the Kumamoto Prefecture (Baba's prefectural base) headquarters." There has never been such abuse of an individual's worth in the case of appointment as a party secretary. Accusations of incompetence are completely unheard of.

The Undaunted Chairman

That the counterattacks by Sohyo and the rightwing have gone so far is not at all due simply to uneasiness about inexperience. While Baba certainly is an unknown newcomer, the concern is really due to the fact that he is believed to be very close to Asukata and is assigned a major role in consolidating Asukata's position.

In July of the year before last Baba gathered young Diet members of the chukan (middle) faction of the party and put together a "New Life Study Association," which has recently become a group of some 50 persons. That this became the foundation for Asukata's victory in the chairmanship election is a fact appreciated by the well informed.

The New Life Study Association was from the start called Asukata's bodyguard, and by bringing together chukan faction members and those previously unaffiliated with any faction and creating a powerful faction that can be described as infused with youthful energy, this led directly to Asukata's victory. Also, since his installation as chairman he is said to have no desire to construct a personal faction. This rests on the view that the New Life Study Association was, in a manner of speaking, presented to Asukata by Baba as a "New Asukata Faction."

In the light of this cooperation, the appointment of Baba as secretary has the feeling of a reward for services. Because of this it can be said that Asukata's bold action in respect to this appointment was somewhat forced, in disregard of opposition. On the other hand, for much the same reason, the rightwing cannot evade resisting to the end, to the extent of refusing to serve on the executive.

Asukata certainly lacks majority support at the level of Diet members. However, he has the support of 60 to 70 percent of the 60,000 party members and of the some 400 general meeting delegates, and in this sense he has the most secure party base of any chairman in history. The basis of his confidence is there.

The matter of immediate concern to Asukata is to transfer to the rightwing the two presently vacant vicechairman positions intended for them, and the additional proposed vicechairman position alloted them by the party, always trying to improve relations. Depending on circumstances, he is also thinking of opening an additional middle-level position and giving it to them. However, he is determined that the secretary position will absolutely not be handed over.

After having forced the appointment by his own decision, if he should later revoke it the political liability would be unquestionable. He hears of grumbling among the rightwingers who have boycotted the executive that "2 years without office is hard to take. There must be some post," and appears to see that "the rightwing will by and by become conciliatory."

The Rightwing Goes on the Offensive

However, in contradiction to this, as already noted, Sohyo and the rightwing are pressing for the holding of a party general meeting this autumn to reverse these appointments, and at present there is no sign at all of a conciliatory spirit.

Rather they are pondering their inferiority in numbers in both party members and delegates and are girding themselves to move to reconstruct their organization. The rightwing, that is, the anti-Asukata faction, derives from the Seiken Kozo Kenkyu-kai (Society for the Study of Building Power) led by Yamaguchi Tsurao, and the Shakai-shugi Kenkyukai (Society for the Study of Socialism) led by Hirabayashi Go, and now they are pressing to strengthen cooperation between the two groups.

The former Eda group within the Seiken Kozo Kenkyukai continues under former National Chairman Tanabe Makoto, who has formed a "Wednesday Association." This is a heterogeneous grouping comprised of the former Eda faction, the former Kawamaki faction, the former "New Stream Society," the Hori group, and so on, and in order not to give it the appearance of a faction, the former Eda faction had been revitalized and designated the "battle group."

The aim of the rightwing is to "bring down Baba" at all costs. However, though the aim is to remove Baba, at present there is no idea that Asukata will agree. Therefore the desparate feeling persists that "under the circumstances there is no alternative but to drive Asukata to resign," and the strategy seems to be aimed at shaking the Asukata-Baba structure from its roots and completely changing officeholders.

Chairman Makieda and head of the executive office Tomizuka of Sohyo are fully behind this move of the rightwing. They take the view that their priorities are the Spring Struggle and unifying the labor movement, reforming the operation of the three public corporations, including the National Railways, and the 1983 decisive political struggle, and that "with Baba as secretary we cannot carry on at all," and they show themselves ready to establish a cooperative committee of the top levels of the Socialist Party and Sohyo to press for the change in officeholders.

However, in contrast to this tough attitude of Sohyo, the attitude in the circles around Asukata is one of confidently seeing feet of clay. "Makieda is in any case leaving office in June. Tomizuka also has indicated to the headquarters that he intends to stand at the next general election, so both men are "lame ducks." What do they really think to accomplish?" They have no thought of handing over anything but "some posts, not including that of secretary, more or less for the sake of appearances" (a source near Asukata).

Still, even for Asukata, who is persistently confident, it is not true that there is no concern. The fact that his own people in the rightwing and Sohyo are continuing all-out opposition has an impact harmful to the image of the party. And the spirits of Baba, whom he has praised as "a man who will be very valuable in the future; we expect youth and energy," are not improving at all.

Further, more than anything else, he must be worried that relations with the other opposition parties, such as Komeito, are awkward. The socialists are unavoidably isolated in Diet business and will find it difficult to establish electoral cooperation in next year's unified regional and House of Counselors elections.

Concerning relations between the Socialist Party and Komeito, after Komeito at its party general meeting at the end of last year switched to a pragmatic line on security and defense policies, the Socialist-Komeito agreement on a plan to attain power in reality become empty. Then, the Socialist Party also acted to widen the gap between the two parties by turning to the left with the election of Chairman Asukata. The complete withdrawal from the executive by the rightwing, an act profoundly related both to the emergence of Baba and to Komeito, has had the effect of spurring on this tendency.

The Armament Expanding LDP, the Armament Reducing JSP

Naturally, neither the Socialist Party nor Komeito is at present thinking of tearing up the Socialist-Komeito agreement on plans to attain power. Komeito desires to preserve its revolutionary image by maintaining the relationship with the Socialist Party, and for the Socialist Party it would hardly do to abandon lightly its aim of approaching power through electoral cooperation and a joint struggle of all opposition parties.

However, relations between the Socialist Party and Komeito, and even more with the moderate parties, have been frozen since the appearance of the violent conflict that can be called "the persecution of Baba." During the recent tax reduction battle, Baba was constantly nagged by Yano, secretary of Komeito, and others, and was finally reduced to continually saying, "You're quite right," so that within the party he had to suffer the outcry, "Has he become a yes-man?" Fear of Komei merges into fear of the moderates, of being in a position where the party cannot maneuver independently.

Asukata himself has adopted the posture of "waiting," saying: "It will be resolved in due course." Then he boldly travelled to Europe, where he concentrated on publicizing the view of an "armaments reducing Socialist Party" against an "armaments expanding Liberal-Democratic Party," and took a position in the forefront of the antinuclear and arms reduction movements.

Thereby Asukata displayed nostalgia for the "politics of defiance" of the Socialist Party of the sixties Security Treaty era, and a feeling that he would rather have the party reborn through antinuclear and arms reduction campaigns than switch to a pragmatic line. Chairman Sasaki of the Democratic Socialist Party and others do not conceal their cautious concern: "If the situation is to tilt now so that the moderates get their turn, it will depend on the Socialist Party. We are critical of the turn to the left, but if, in return, there should be an unexpected revitalization of power...."

However, there is nothing to do but wait for the people to decide whether the Asukata line on party administration and political style will receive popular support. The problem is that if this abnormal situation of flying on a single engine, without the rightwing, continues indefinitely and the conflict lasts for long, it will place stress on the organization, for which reason alone things depend on how soon the situation can be brought under control.

However, if Baba resigns it will lead to his own resignation. Just transferring a few posts to the rightwing will not bring the situation under control. Unless both resign together the confrontation will continue.

Even in Baba's base organization, the New Life Study Association, there is discord due to unhappiness at his appointment. Similarly, within the Socialism Association, (Association faction), which supported Asukata, there is a move to abandon him in reaction to his high-handedness. Asukata is in a difficult position.

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MILITARY

NATIONAL, INTERNATIONAL FACTION DEFENSE POLEMICS EXAMINED

Tokyo TOKINO KADAI in Japanese Apr 82 pp 72-75

[Interview with Hachihiro Nakagawa, assistant professor at Chikuba University, by Tetsu Sakuwa: "The Defense Arguments of National and International Factions"]

[Text] Public Problem

It may be an exaggeration to call it urgent, but this month I would like to report on an interview with Hachihiro Nakagawa (assistant professor at Chikuba University). The reason for the interview with Nakagawa is that he is in the thick of a trial.

Perhaps this trial may be called a "defense argument" trial with Masamichi Iinoki (former president of the Defense Academy), or a "freedom of speech" trial.

[Question] What is the origin of this affair?

[Nakagawa] At present, the defense arguments are in an era of a "split in conservatism." It is not an era of confrontation between conservatives and leftists. It is a confrontation among conservatives between those who want to amend the constitution and the U.S.-Japan Security Treaty and those who want to maintain the status quo.

Commentator Yasushi Sakurai wrote in the monthly publication SHORON that this is a confrontation between the international faction and the national faction. And Masamichi Iinoki of the national faction (the faction for maintaining the present status quo) has criticized the international faction (this includes those who advocate the Soviet threat theory) in CHUO KORON as follows.

"If a situation in which the Soviet military very simply gains supremacy over Japan is depicted by those with 'uncertain expertise,' there are many good Japanese who would shudder. As a result, the authors of the Soviet threat theory would frustrate the intent of Japanese resistance in an objective manner and would render service to the USSR's political objectives.

"I do not want to doubt the 'good intentions' of these people, but it results in giving the impression that Japan would surrender without a fight. They themselves fall, as it were, into the Soviet 'trap.'

"The Soviet threat theory should be severed from the issues of maintaining and strengthening Japan's defense capability. It is especially foolish for our attention to be absorbed solely by northeast Asia or the Far East. It is natural that the stationing of Soviet troops on Kunashiri, Etorofu and Shikotan excited Japanese public opinion, but if one is surprised at such an event, his competence for living in the decade of the eighties in the 20th century must be doubted."

Therefore, I, a member of the so-called international faction, wrote in GETSUYO HYORON that such comments from Iinoki "make it seem he has become a representative of the Soviet Government." Then, he did not refute this in writing but brought a civil suit against me.

[Question] Do you think your expression was too severe?

[Nakagawa] No, it was not. If Iinoki, a rational intellectual, is surprised at such an expression, he himself should not have expressed himself in the following manner.

First of all, he did not use specific names, but it is widely known in press circles that the literary scholar is Jun Eto and the philosopher is Michitaro Tanaka.

"I think the scenario in which people who know nothing of law develop strange treatises on legal principles is comical. The situation is serious if this is an era of '100 million citizens negating the entire law.' If it were thought that there are few eminent constitutional scholars, I can understand the feeling of men of learning in other fields wanting to argue the constitution, but the constitutional arguments by a literary scholar and philosopher have no meaning beyond the opinions of individual citizens."

He also heaped scorching words on Ikutaro Shimizu. Let me give you some excerpts.

"We can conclude that this man's treatise (Shimizu) is 'an enormous lie with sprinklings of brilliant truth.'" "He (Shimizu) has entered the stage as a fanciful leader of the militarists." "His method (Shimizu's treatise) is extremely clever." "Certainly there is something in common between the assertions of Shimizu and those of Hitler." Or his comment concerning Ichiro Hatayama: "When Ichiro Hatayama was singing the song of constitutional revision as he drooled...." (SHUKAN GENDAI)

He even used the expression, "drooling" when he criticized Hatayama's arguments for constitutional amendment.

[Question] You were sued for libel by Iinoki, weren't you?

[Nakagawa] Yes. But this is what is strange. The object of the treatise I wrote is a defense essay concerned with the nation's security, and that is ultimately concerned with the advantages and disadvantages to the public and a matter of intense general concern and interest. Its purpose was not the disclosure of his public activities and unrelated private life, nor simply an attack on his person, but clearly something related to the common good.

Iinoki served as president of the Defense Academy for a long time, and at present he holds the position of chairman of the "Peace and Security Research Institute," a foundation authorized by and under the joint jurisdiction of the Defense Agency and the Ministry of Foreign Affairs; and he is a person with the power of influencing government policies. Since he published the treatise under his title of chairman, if one cannot discuss and criticize it, the present democratic system of our country, based on freedom of speech, will crumble at its roots.

By the way, using the FY-80 statement of accounts as an example, the Peace and Security Research Institute is unmistakably a public institution, having received 26.1 million yen from the Defense Agency and 2.5 million yen from the Ministry of Foreign Affairs.

Comparison with Soviet Claims

The following account appears in "Nihon no Boei: Shoten to Moten" [Japan's Defense: Focal Points and Blind Spots] (published by Nikkei Shimbunsha) by Tatsuo Yoshikawa.

"Masamichi Iinoki's reaction to 'Kaku no sentaku' [Choice of Nucleus], written by Ikutaro Shimizu, was extremely cold-blooded. Iinoki somehow seems to have rotated to the left in his reaction to this report by Shimizu. And I think it was about that time that it was rumored that Iinoki also took to task the Hideaski Kase-Osamu Miyoshi group as a 'pressure group' and declared that he drew the line between the position of his own research institute as a 'research institute' and theirs. That is to say, Iinoki, who had the backing of the Self-Defense Forces officials until that time, declared his 'estrangement from the self-defense officials.'"

The world, and especially the arguments on defense, are at a turning point. Perhaps this trial is an incident which seems to symbolize the changes of the era.

I asked Nakagawa: "In what way is there a resemblance between Iinoki's statements and statements by the USSR?"

Concerning the Soviet Military in the Northern Territories

[Nakagawa] The USSR stated: "There is no basis for Japan to regard it as a threat with just a few troops stationed on the southern Kurile Islands."

Iinoki said: "I am utterly opposed to the thinking that Japan must maintain and strengthen its defense capability since the USSR has built up its military strength in the Far East area." He also said: "...However, it is quite sad to say we must equip and strengthen our defense capability to confront the stationing of a military force on the three islands."

Concerning Soviet Threat

The USSR says: "In the same way, it is wrong to put forward the 'Soviet threat' lie, which is often used in order to justify the position of the Japanese Government" and "Japan is the same; in many countries, influential persons who try to place responsibility on the USSR for the competition in military expansion and the intensification of international tension are very active and are circulating the fabrication about the 'Soviet military threat."

On the other hand, Iinoki says: "The scholastic debate over whether the USSR is or is not a threat to Japan, although it may be a liability, is in no way an asset for Japan's defense capability preparedness." And "I want to say that the discussion of whether the USSR is a threat or not is not only unproductive but quite useless and detrimental."

Concerning Such Problems as USSR Internal Economy

The USSR's comments are: "During the recent 5-year period, there were 3 years with poor crop harvests. It is natural for us to improve the plan, adapting the planning centered on agriculture to additional factors. For that reason, it is unavoidable that growth will slow a little. Because of that alone, the USSR cannot help but consider reducing somewhat the military burden. Certainly, the Soviet economy's GNP is low compared to that of the United States. It is painful that military expenditures take a large slice of it."

As for Iinoki's assertions: "It is clear that Japan, a neighbor of the USSR which has such strengths and weaknesses, must not make the 'threat' from the USSR the basis for its defense capability preparedness. It is infinitely foolish for Japan to consider the USSR, which suffers from difficult internal and external problems, a 'threat.'"

Concerning the Minsk

The USSR said: "There is also much talk about the Minsk, but those who are upset forget that, in fact, there are a total of six carriers in the U.S. fleets, two in the Seventh Fleet and four in the Third Fleet. As can be seen when the figures are listed, there is no threat at all."

Iinoki's view is: "If there is an uproar when the antisubmarine cruiser comes, or a loud cry is raised when the Ivan Rogoff appears, it will only make the Soviets grow more impudent and take advantage of Japan. The same thing can be said of the stationing of the 'Backfire' bomber or intermediate-range ballistic missile, the SS-20."

In fact, what will happen in this trial?

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MAZDA'S TECHNOLOGY DEVELOPMENT FOR THE 1980'S REPORTED

Tokyo ADVANCE TECHNOLOGY DEVELOPMENT FOR THE 1980's in English 1980 pp 1-21

[Text]

INTRODUCTION

Energy saving has become a major premise to control our daily life in recent years. The energy consumption in the case of an automobile is classified broadly into material producing energy, vehicle manufacturing energy and vehicle driving energy, and the ratio of these three elements is estimated at 10:5:85. Since the fuel economy is a decisive factor to determine the total economy of a vehicle, it is of a nature which, unlike the exhaust emissions and safety, cannot be satisfied merely by clearing the mandatory standards, but which has to vie for superiority at a much higher level than the mandatory level.

Under these circumstances, we are concentrating our effort on developing various techniques including engine improvement and adoption of electronics for optimum engine control, weight reduction and reduction of running resistance to improve the fuel economy without sacrificing the vehicle performance, drivability, utility, etc. We are aiming at improving the fuel economy by 30% by 1985 through the improvement of these factors mentioned above.

Engine Improvement

Although we cannot overlook the development of a continuous combustion engine such as a Stirling engine and a gas turbine engine as an alternative engine in the future, these engines in their current state of art are unsatisfactory in respect of their thermal efficiency.
In order to improve the thermal efficiency, it is necessary to raise the operating gas temperature, which to a great extent depends on the development of materials to bear the high temperature. Therefore, we believe, the leading engines in the 1980's are a spark ignition Otto cycle engine and a diesel engine as used to be. In the following, we express our views and prospects on the further improvement with regard to the Otto cycle engine and diesel engine.

1 IMPROVEMENT IN EFFICIENCY OF OTTO CYCLE ENGINE

The improvement in engine efficiency will be achieved by the precise engine controls applying electronics, in addition to the improvement in thermal efficiency, reduction of cooling loss, and improvement in mechanical efficiency.

1-1 Improvement in thermal efficiency

The thermal efficiency normally improves if the theoretical thermal efficiency and the combustion efficiency are improved. In order to improve the theoretical thermal efficiency, it is most effective to increase the compression ratio. The relationship between the theoretical thermal efficiency and the compression ratio is shown in Fig. 1.

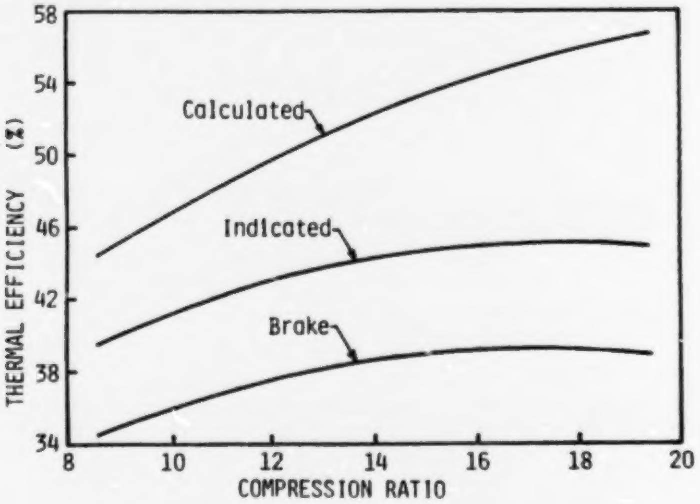
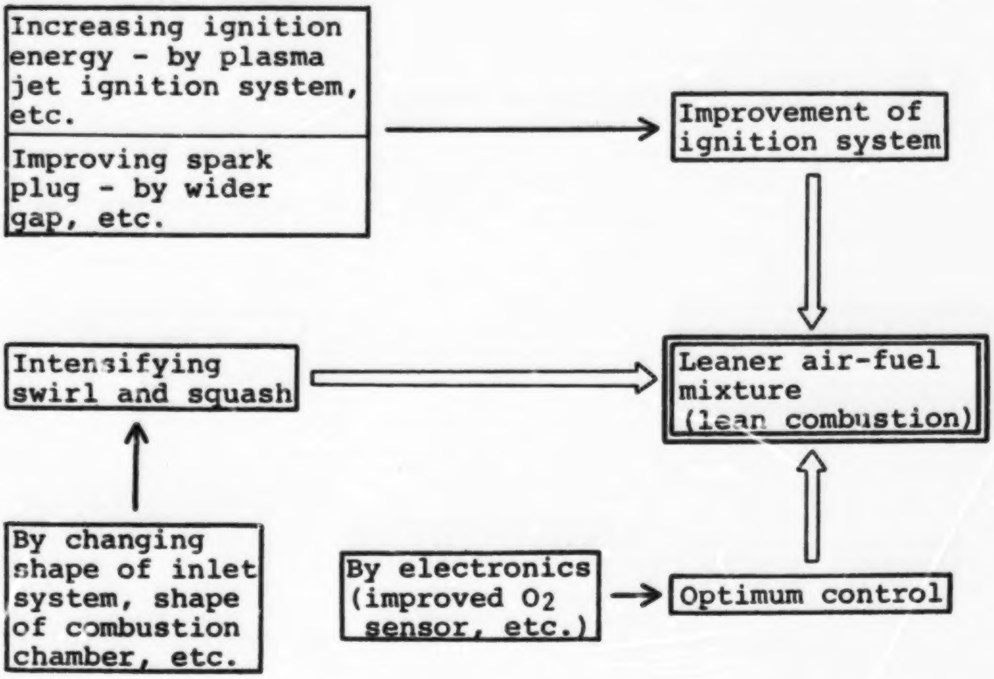


Fig. 1 Effect of compression ratio on thermal efficiency

Increasing the compression ratio requires high-octane fuel, however, since tetraethyl lead among others cannot be added to the high-octane fuel, it now becomes the major subject to conduct research and development not only on the fuel side such as methanol additives and methanol reformed gas additives but also on the anti-knocking measures by improving the combustion mechanism through stratified combustion and wall evaporation. Our target is to achieve the compression ratio of 10 - 11 : 1 in the immediate future and 14 - 15 : 1 in the latter half of the 1980's. If the compression ratio of 14 - 15 : 1 is achieved, the fuel economy of the gasoline piston engine will be improved to a level comparable to the current diesel engine's. In order to improve the combustion efficiency, operating at a leaner air-fuel mixture is the main subject and we are continuing the research in the following direction.


Increasing ignition energy - by plasma jet ignition system, etc.
Improving spark plug - by wider gap, etc.
Improvement of ignition system
Intensifying swirl and squash
Leaner air-fuel mixture (lean combustion)
By changing shape of inlet system, shape of combustion chamber, etc.
By electronics (improved O2 sensor, etc.)
Optimum control

Although the lean combustion with intensified swirl and squash has already been proved in the Mazda Stabilized Combustion System (MSCS), which is applied to the Japanese and North American versions of Mazda gasoline piston engine, we are continuing the research and development to improve this further.

An example of the effect of the ignition system and combustion chamber on the leaning of air-fuel ratio is shown in Fig. 2.
It is very clear from this figure that how the swirl in the combustion chamber and ignition energy affect the stable combustion at a leaner air-fuel mixture.

The target of the thermal efficiency improvement by a leaner air-fuel mixture is expected to be about 5 - 10%.

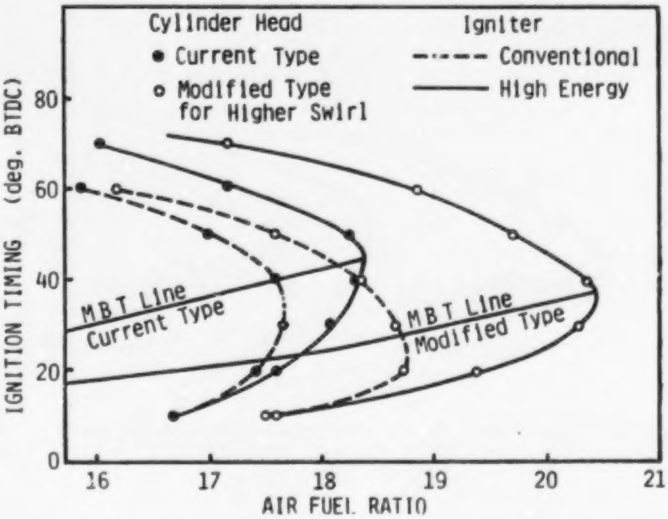


Fig. 2 Effects of high energy ignition and modified cylinder head for higher swirl on misfiring limit

1-2 Improvement in mechanical efficiency

When the engine mechanical friction loss is reduced by 10%, we can expect to improve the fuel economy by about 3%. Fig. 3 shows an analysis of the mechanical friction loss and the improved target of mechanical friction loss.
In order to reduce the friction loss, it is the most effective to reduce the piston friction. In addition, the weight reduction in moving parts, such as the crankshaft, connecting rods, pistons, valve train, etc., is also important.

We have already adopted aluminum rocker arms and we are conducting further research to use aluminum or Fiber Reinforced Metal as a material for connecting rods, rocker arms, etc. In addition, there are many accessories which consume power such as

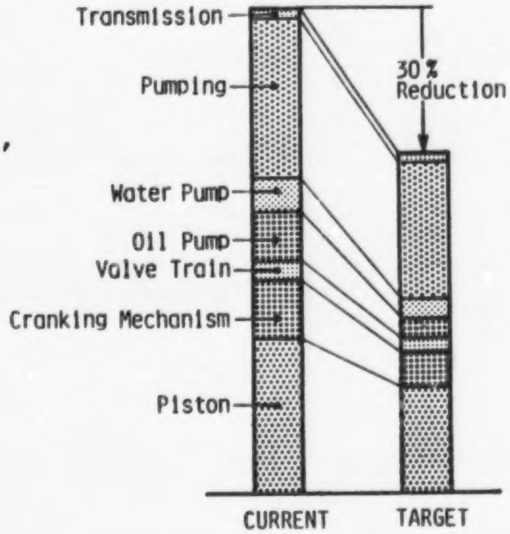


Fig. 3 Analysis of mechanical friction loss and reduction target

an oil pump and a water pump, and we have begun a development to increase the efficiency of these accessories. By putting all these factors together, we are aiming at an improvement in mechanical efficiency by about 30% by the second half of the 1980's. The fuel economy improvement by this activity is projected at approximately 10%.

1-3 Electronic engine control

As the air-fuel mixture is made increasingly lean to improve fuel economy, the demands for a precise fuel control, an optimum ignition control and a precise EGR control are getting stronger. In order to meet these demands, we are in process of developing an electronic control, which has already been applied actively to heavy duty vehicles, for light duty vehicles.
The electronically controlled carburetor is generally a closed loop type using an O_2 sensor, and it has been clarified that we shall be able to obtain 4 - 5% improved fuel economy by controlling to the stoichiometric air-fuel ratio by this method. However, it is necessary to control the air-fuel mixture on the leaner side than the stoichiometric air-fuel mixture for the purpose of further increasing the effect. For this purpose, it is necessary to develop, for example, a new O_2 sensor which precisely controls mixture at a leaner air-fuel ratio.

In case of adopting the fuel injection method, there will be a greater freedom in selecting the air-fuel ratio by using the closed loop control method coupled with the MAP control method. Furthermore, there will be several other advantages such as simplified starting system, reduced evaporative emission and improved cornering performance, and we believe that the fuel injection system has a higher potential for the future fuel supply system.

We are also conducting research on electronically controlled ignition, EGR, and fuel supply systems. Fig. 4 indicates the improvement in fuel economy by these measures.

Reducing the cost by simplifying the system is as important as improving the effects on the fuel economy and the drivability, and we are now working hard on these themes.

	IMPROVEMENT RATE
Fuel Supply System	4 - 5%
Ignition System	2 - 3%
Exhaust Gas Recirculation System	2 - 4%
TOTAL	8 - 12%

Fig. 4 Improvement of fuel economy by electronic control

1-4 Others

As the future measures to improve the fuel economy, one of our research subjects is to put into practical use a variable mechanism to optimize the lift of the intake and exhaust valves and the open and close timings according to the driving condition. In addition, since the fuel efficiency is especially sacrificed till the engine is warmed up, an atomization device is under development to improve this condition. The effect of the improved fuel economy by this device is expected to be about 20% in short distance driving and about 5% in the U.S. city mode.

1-5 Supercharging

We are currently studying a turbo-charger from two directions. The first is to use the turbo-charger on the current engine/body combination and create the high performance vehicle while keeping the fuel economy at the same level as it is. The second direction is to contrive an increase in low and middle speed torque by combining the turbo-charger with the engine and to reduce the engine displacement by the amount of increase in the torque while maintaining the current performance. According to the test results, it becomes clear that the low-middle speed torque can be improved by nearly 30% by adopting the turbo-charger and if the improved amount is appropriated to the reduction of engine displacement, it improves the fuel economy by nearly 30%. Thus, the merit for improved fuel economy is large. But, there are several problems to be solved by the time of its practical use.

(1) Improvement of the characteristic of turbo-charging to uplift the low speed torque.

(2) Reduction of knocking in the low speed range

(3) Reduction of friction loss

(4) Cost reduction of turbo-charger

It will take some time to solve these problems and, therefore, the first generation of turbo-charged automobiles will be the former one with optimum fuel economy.

Concerning the first direction, the turbo-charged gasoline piston engine, rotary engine and diesel engine all indicate the similar characteristics. Fig. 5 is a sketch of the turbo-charged piston engine and the performance at laboratory level is shown in Fig. 6.

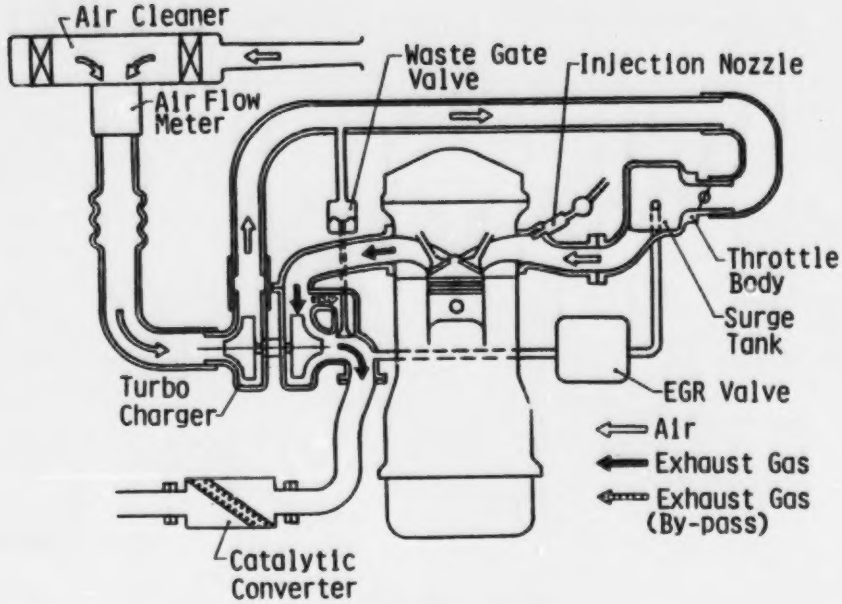

Air Cleaner
Air Flow Meter
Waste Gate Valve
Injection Nozzle
Throttle Body
Surge Tank
EGR Valve
Turbo Charger
Catalytic Converter
Air
Exhaust Gas
Exhaust Gas (By-pass)

Fig. 5 Turbo-charged engine

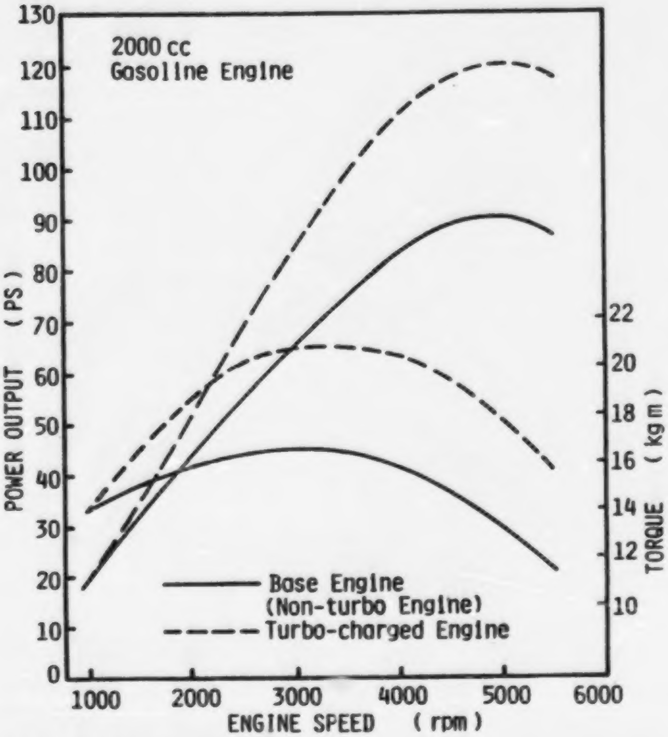


Fig. 6 Performance comparison of turbo-charged engine and non-turbo engine

2 FUTURE PROSPECT OF ROTARY ENGINE

The rotary engine is well known as an automobile power plant for its compact size, high output, light weight, quietness, and relative freedom from vibration. It is expected that the environments in which the rotary engine can show its advantages will be even greater in the latter half of the 1980's than at present.
It is also fully expected that the rotary engine for automotive use will, with simple modifications, become applicable to new fields, such as marine application as an engine for a motor boat.

It is not too much to say that the chief interest in the rotary engine is the prospect of how much improvement the rotary engine can achieve in its fuel economy in the future. The combination of the rotary engine with catalyst had been deemed impossible in the past, but was put into practical use as a result of Toyo Kogyo's extensive development effort. The rotary engine combined with catalyst was introduced in the Japanese market in September 1979 and will be introduced in the North American market from the 1981 model year. Fig. 7 indicates the fuel economy improvement by the catalyst system and the fuel economy targets of the Mazda RX-7 for 1981 and 1983.

Through the application of catalyst, the rotary engine has been improved in its fuel economy by about 20 % in the Japan's 10-mode test and is already at a level close to a piston engine of the same class. A wide variety of research and development activities are being pushed forward in an attempt to improve the fuel economy by improving the gas sealing efficiency, shape of the combustion chamber, ignition system, and air-fuel mixture supply system among others.

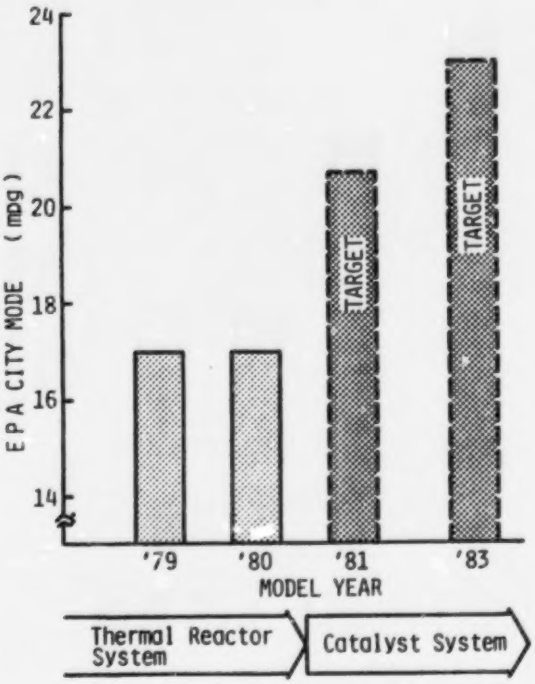


Fig. 7 Fuel economy improvement targets for rotary engine of the RX-7

At the same time, the medium- and low-speed torque is being improved through betterment of the gas seals and intake system (Fig. 9). Various studies are being made, centering around a supercharging system called the TISC (Timed Induction with Super Charge)(Fig. 8), and it is expected that the rotary engine will make rapid progress in its torque at medium and low speeds not in the too distant future.
The realization of this improved torque at these speeds would make it feasible to decrease the final gear ratio and reduce the displacement of the engine and, when coupled with abovementioned techniques to improve the fuel economy, would make it possible to place the rotary engine over the piston engine in fuel economy level.

It is as a matter of course that the rotary engine, which is an Otto cycle engine, should utilize most of the technical innovations discussed in the previous chapter.

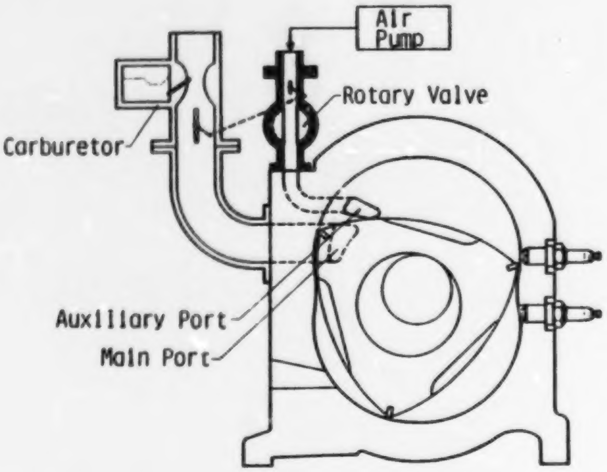


Fig. 8 TISC system
(Timed Induction with Super Charge)

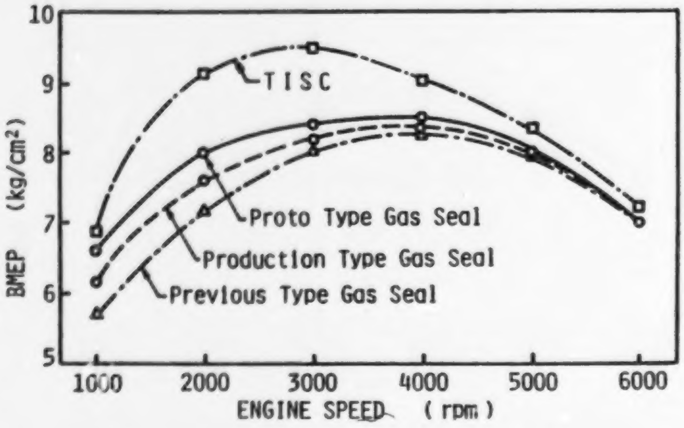


Fig. 9 Effects of TISC and gas seal improvement on performance at W.O.T.

3 FUTURE PERSPECTIVE OF DIESEL ENGINE

Since 1967, Toyo Kogyo has been producing and marketing diesel engined light-duty trucks. In recent years utilization of a diesel engine into the field of a light duty truck has been rapidly expanding in Japan, and the percentage of the diesel engine versions in 2 ton trucks reached 95% in 1979 compared with 54% in 1970. Toyo Kogyo has recently realized utilization of a diesel engine even on 0.75 ton trucks.

Meanwhile, utilization of a diesel engine in the passenger car field has also been rapidly accelerated in accordance with the gasoline price increase. Though the diesel engine has problems in the aspects of vibration, noise, performance, etc., its fuel consumption is 20 - 35% better than the Otto cycle engine. Whether or not the diesel engine will form the main stream of the passenger car engines in the future will be, however, greatly affected by the pace of the further improvement and progress of the diesel engine and also by the improvement in the fuel economy of the piston engine. Other than the abovementioned, there are problems which affect the future of the diesel engine such as vibration, noise, exhaust gas including NOx and particulates and the diesel oil supply.

We believe that the engine weight reduction and heat insulation of the combustion chamber are the most important to achieve less noise and less vibration as well as improved fuel economy of the diesel engine for passenger cars. As for the heat insulation, we are making every effort to develop adiabatic metals for the combustion chamber and ceramics for some parts. On the other hand, for improvement in the power output and fuel economy, we have already started the research and development of a turbo-charged diesel and a small sized direct injection diesel, because we believe that the feasibility of these engines is the key element. As for the measures against exhaust emissions such as NOx and particulates, development of the optimum swirl chamber shape, selection of the most suitable fuel injection system and development of the after-treatment system are essential.

EGR is a possible measure to reduce NOx; however, when the EGR ratio is increased, the HC and smoke levels increase as shown in Fig. 10.

To cope with this problem and to meet the future particulate regulation, we are studying a particulate trap system.

Fig. 11 is an example of the particulate trap efficiency when a particulate filter is used.

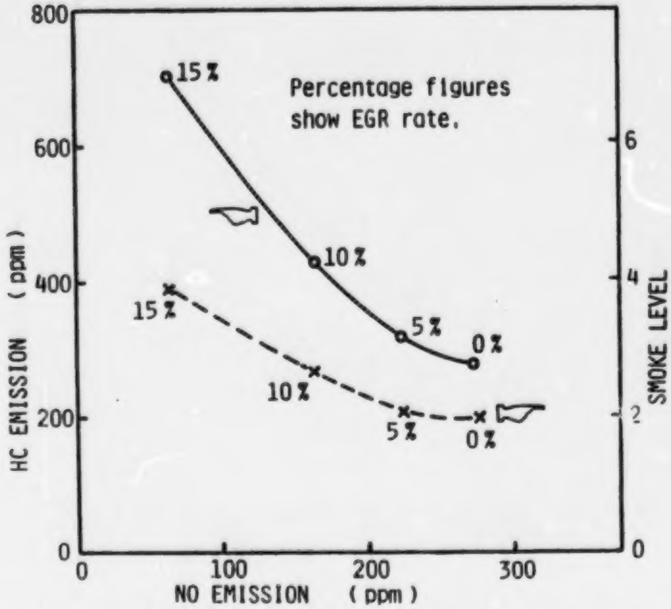


Fig. 10 Effect of exhaust gas recirculation on NOx for the diesel engine

To solve various problems of the diesel engine, the advantage of fuel economy over the gasoline piston engine must always be kept. Therefore, we cannot simply rely on the combustion improvement, but we have to create a total engine system to solve these problems.

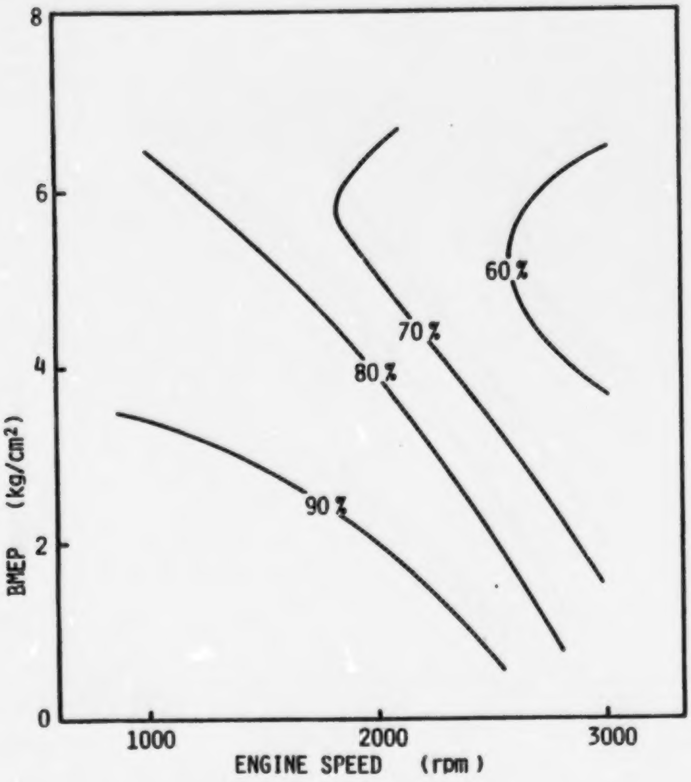


Fig. 11 Particulate trap efficiency

4 ALTERNATIVE FUEL APPLICATION

Because of the shortage of the fossil resources, various types of alternative fuel are becoming spot-lighted in the recent years, such as alcohol-gasoline blend and LPG. LPG is very popular fuel in Japan because the most of the taxi cabs are powered by LPG due to its cost advantage. Toyo Kogyo is a producer of LPG cars for taxi cabs.

Since we have no experience in gasoline/LPG mixed fuel, which is used in some overseas markets, we have started a research and development work on this fuel, too.

In the case of alcohol-gasoline blend, application is more complicated than LPG because some kinds of alcohol and additives require special techniques to run the engines on them.

Alcohol-gasoline blended fuel

We have been evaluating both methanol and ethanol. According to our test results, ethanol-gasoline blend at a 10% rate, which is already put into practical use in the U.S.A., does not pose any severe problems except some deterioration of vapor locking, hot start characteristics and evaporative emissions.

When methanol is mixed by more than 10% into gasoline, these problems get deteriorated further and wear of the engine components becomes also accelerated in both gasoline piston and rotary engines.

We are carrying out extensive tests on the ethanol-gasoline blend and also carefully studying the acceptability of the methanol-gasoline blend, and development of the following points are important:

(1) Increase in the compression ratio to utilize higher octane rating of the alcohol fuel

(2) Ignition control by a knocking sensor to cope with a variety of octane ratings of fuel in the markets

(3) Development of the fuel injection system to cope with the deterioration of the evaporative characteristic

(4) Development of the fuel control system for obtaining optimum air-fuel ratio to cope with a variety of fuel in the markets.

WEIGHT REDUCTION

The effect of the vehicle weight on the fuel economy is great. In the same body shape, the weight reduction of 10% improves the fuel economy by about 2-5%. If the improvement in performance due to the weight reduction is added to the calculation, the improvement rate in the fuel economy becomes more than the double, i.e. about 5-8% improvement in the fuel economy can be expected by the 10% weight reduction. As general methods of the weight reduction, [1] down sizing, [2] rational design, and [3] use of light materials are conceivable. In case of large-sized automobiles, the down sizing may yield great effect on weight reduction. In case of small-sized cars, however, a limit for the down sizing of the vehicle itself naturally exists. Therefore, [2] and [3] become basic measures against the weight reduction.

Regarding the rational design, optimization of the body size, effective design structure, down sizing of the component parts, and reduction of the excess use of materials, become important. In order to make the study on these areas, strength and rigidity analyses under the finite element method and simulations by computers have been widely utilized at Toyo Kogyo. This tendency will be further accelerated in the future.

1 TARGET OF THE WEIGHT REDUCTION

By 1985 Toyo Kogyo aimes at reducing the vehicle weight by about 10% over the 1980 models (based on the similar equipment level). By this reduction, about 5-8% improvement in the fuel economy is expected to be attained. In order to realize this target of the weight reduction, it is certainly necessary to overcome many problems such as cost, reliability, noise, vibration and safety.

2 APPLICATION OF LIGHT MATERIALS

Application of light materials is effective for substantially reducing vehicle weight. When selecting new materials, evaluation of production energy required for each material has to be made.

2-1 Light weight metal

It is clear from Fig. 12 that steel will still hold its dominant position for quite some time to come. Therefore, in order to reduce weight by efficient use of steel, use of high strength steel becomes more important since about 75% of the vehicle weight is currently occupied by steel.

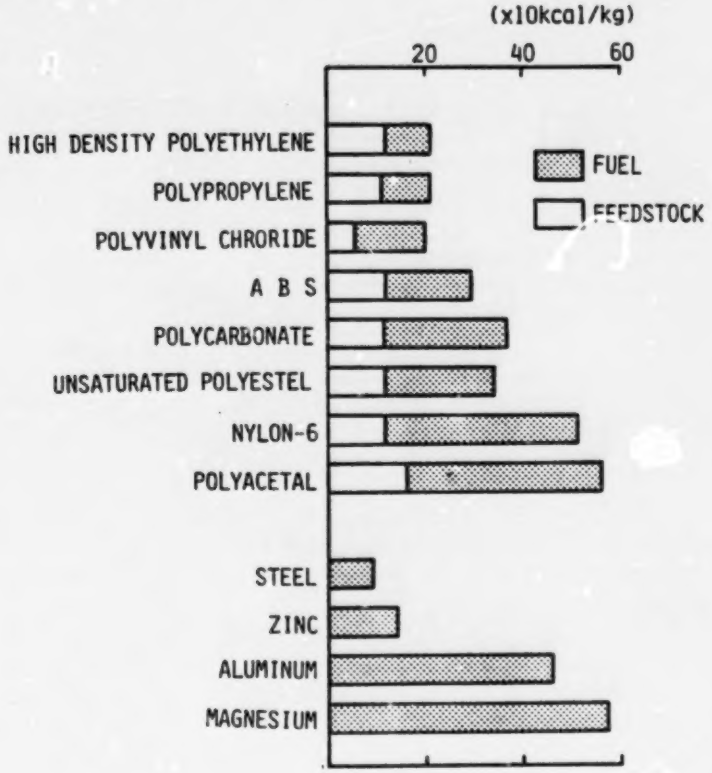


Fig. 12 Energy requirement for producing various materials

In case of Toyo Kogyo, the high strength steel has already been applied to new Mazda 323/GLC. Although the high strength steel will be used mainly for body reinforcement members as shown in Fig. 13 for the time being, it is expected to be gradually expanded over external body panels. Since, the high strength steel sheet enables the reduction of the conventional steel thickness by 10 - 15%, it is possible to decrease the weight by 10 - 15%.

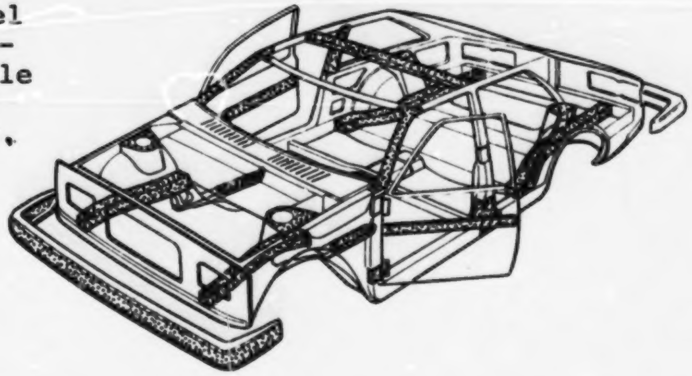


Fig. 13 Application of high strength steel

Materials such as aluminum and magnesium have already been applied to automobiles to some extent and these materials will be more widely used in the future (Fig. 14, 15 and 16).
Especially magnesium is an attractive material, and its applications to the transmission case, clutch housing, timing chain case, etc. are being studied at Toyo Kogyo.

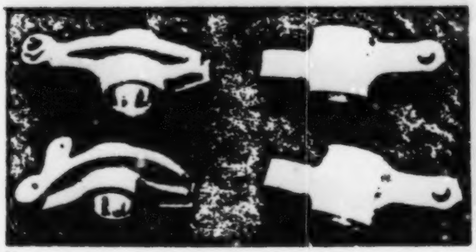


Fig. 14 Aluminum rocker arm

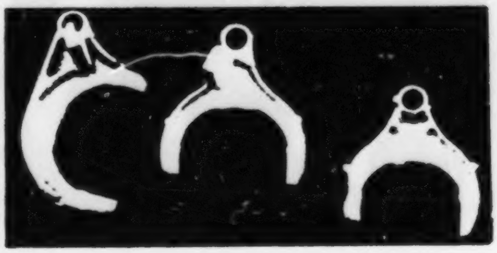


Fig. 15 Aluminum shift fork

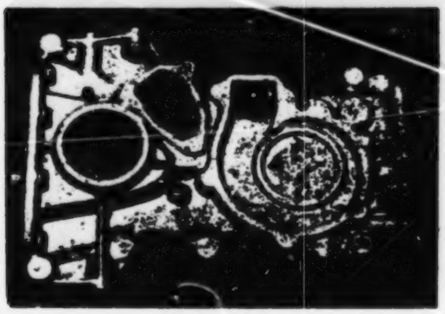


Fig. 16 Magnesium timing chain case

2-2 Plastics

Plastics will play an important role in the weight reduction in the future, and Toyo Kogyo is carrying out the development in the following fields in addition to the application of general purpose plastics (Fig. 17).

(1) Engineering plastics

Engineering plastics like nylon, phenolic, etc. are being studied for application to many parts such as cylinder head cover, oil pan, timing belt pulley, and carburetter (Fig. 17, 18 and 19). Many of these will be realized in the first half of 1980s.

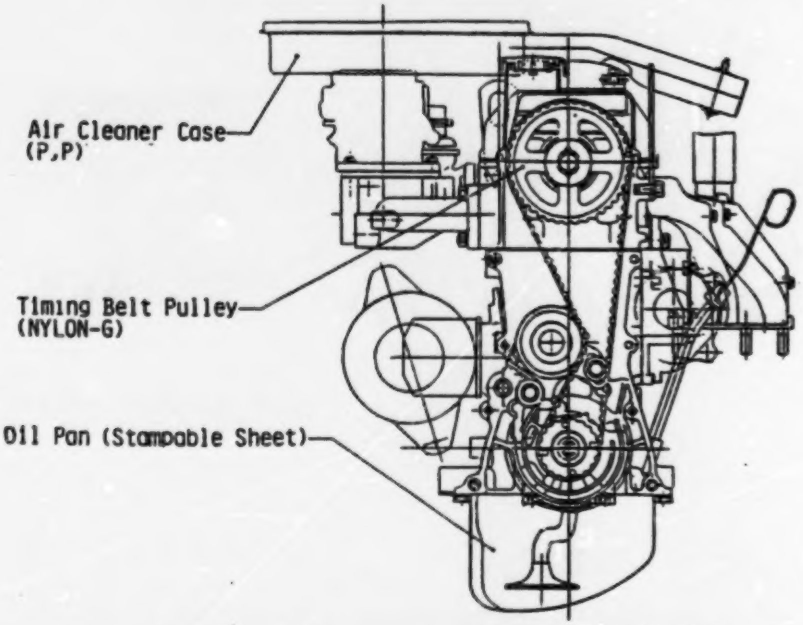

Air Cleaner Case
(P,P)
Timing Belt Pulley
(NYLON-G)
Oil Pan (Stampable Sheet)

Fig. 17 Application of general purpose plastics and engineering plastics

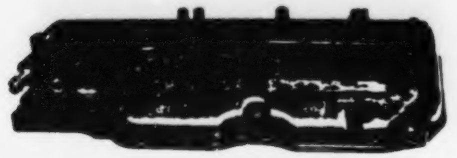


Fig. 18 Plastic cylinder head cover

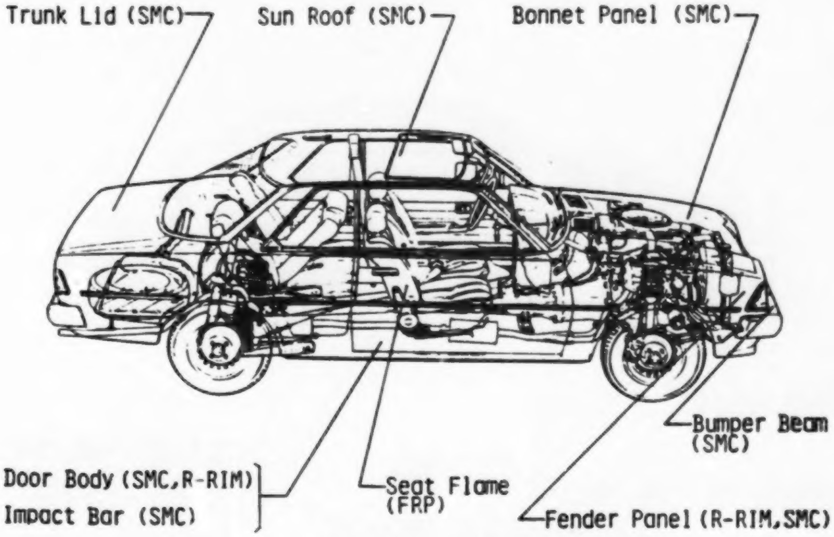
Fig. 19 Plastic thermostat cover and change control case

(2) Reinforced reaction injection molding

Study of reaction injection molding (materials like polyurethane which is produced by hardening two types of liquid materials injected into a mold) is now being carried out to reinforce its rigidity with fiber glass, etc. for future applications to external body panels such as fender and external door panel (Fig. 20). There is a great possibility that these applications will also be realized in the first half of 1980s.

(3) Fiber glass reinforced plastics

Polyester reinforced by fiber glass is being studied at Toyo Kogyo as an attractive material in terms of cost, strength, and rigidity, but problems of surface finish, shrinkage, etc. must be solved.
Bumper beam, bonnet, trunk lid, sun roof, etc. are considered as its area of use (Fig. 20).


Trunk Lid (SMC)
Sun Roof (SMC)
Bonnet Panel (SMC)
Bumper Beam (SMC)
Door Body (SMC, R-RIM)
Impact Bar (SMC)
Seat Flame (FRP)
Fender Panel (R-RIM, SMC)

SMC: Sheet Molding Compound

Fig. 20 Application of reinforced reaction injection molding and fiber glass reinforced plastics

(4) Graphite fiber (carbon fiber) reinforced plastics

Although this is plastics reinforced with expensive carbon fiber, researches on its application to the component parts which require strength and rigidity are being carried out. A sharp reduction in the production cost can be expected if mass production facilities will be set up in the future. Its applications to propeller shaft, leaf spring, suspension arm, etc. are being studied (Fig. 21).

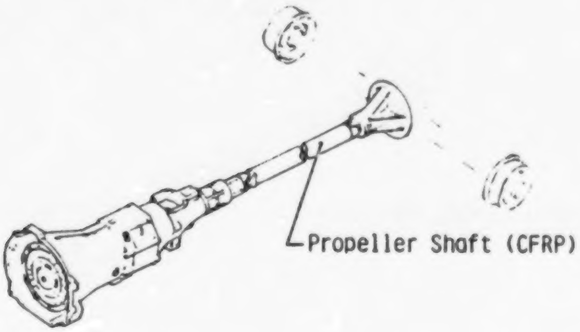


Fig. 21 Application of graphite fiber (carbon fiber) reinforced plastics

3 PROCESSING TECHNIQUE

Research subjects among others are techniques of manufacturing thin plastics and cast metals which will accomplish both the weight and cost reductions and of producing a compact structure by using electron beam welding. The subjects for energy saving measures also include techniques of plasma carburizing, powder forging and the methods with which welding time is short and welding distortion occurs less.

Running Resistance

From the standpoint of fuel saving, the reduction of running resistance is an important factor as well as the improvement of engine itself and the reduction of vehicle weight.

Running resistance can be classified into two factors; air drag and rolling resistance. As shown in Fig. 22, the air drag increases sharply when vehicle speed increases while the rolling resistance moderately rises with the increase in the vehicle speed. At around 50 - 60 mph, the air drag reaches the equivalent level to the rolling resistance and at the higher speeds, the air drag plays a critical part in running resistance.

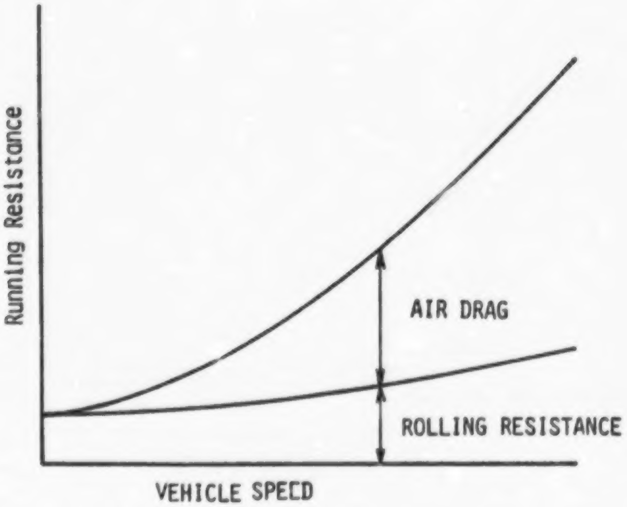


Fig. 22 Relation between running resistance and vehicle speed

1 AIR DRAG

Air drag is determined by the multiplied product of frontal projected area, air drag coefficient (Cd) and dynamic pressure, while the frontal projected area cannot be changed greatly from the standpoint of an interior space requirement.

In case of Mazda, Cd of existing models varies within the range of 0.36 - 0.51 depending on vehicle types or body shapes. Cd can be substantially reduced without making any profound change of the basic body shape of the vehicle if various portions are effectively designed. Fig. 23 shows an example of achieving nearly 25% reduction of Cd from the original with the least change in various parts of vehicle design.

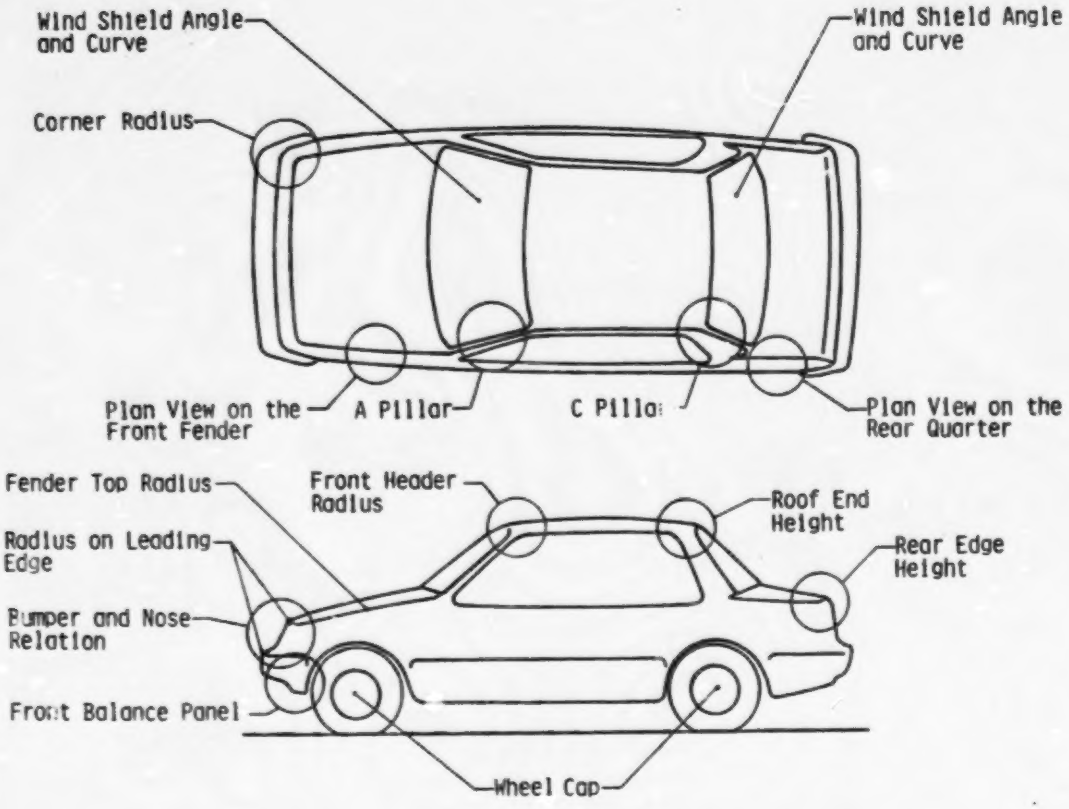

Wind Shield Angle and Curve
Wind Shield Angle and Curve
Corner Radius
Plan View on the Front Fender
A Pillar
C Pillar
Plan View on the Rear Quarter
Fender Top Radius
Front Header Radius
Roof End Height
Rear Edge Height
Radius on Leading Edge
Bumper and Nose Relation
Front Balance Panel
Wheel Cap

Fig. 23 Effect of various parts design on Cd reduction

Although Mazda 626 has already reached the Cd level of 0.38, which is one of the best in its class, Toyo Kogyo is further advancing its researches into aerodynamics aiming at the Cd target of 0.35 (sedan) - 0.30 (sports and sporty types) in the latter half of 1980's. With this improvement in aerodynamic efficiency, more than 10% fuel economy improvement in highspeed driving can be expected to be obtained.

2 ROLLING RESISTANCE

Rolling resistance is caused by the tire, brake drag and friction of the drive train. About 90% of the rolling resistance is by the tire and, therefore, major reduction of the rolling resistance can be accomplished by improving the tire.

Rolling resistance by the tire is mainly generated by an hysteresis loss caused by the distortion of the rubber and code of the tire. Therefore, we are carrying out the study on the selection of the optimum structure and material which causes less hysteresis loss to reduce rolling resistance.

Toyo Kogyo is also making every effort studying suspension among others to further improve cornering performance, handling stability and comfort, which generally contradicts the reduction of rolling resistance.

Currently 30% reduction of rolling resistance is aimed at improving fuel economy by 4% in city driving and by 6% in highspeed driving.

CSO: 4120/274

STRATEGY FOR COAL LIQUEFACTION DISCUSSED

Tokyo ENERUGI FORAMU in Japanese Apr 82 pp 16-17

[Text] Japan's coal liquefaction policy now stands at the crossroads.

The first shock came last year when the SRC-II coal liquefaction project, a joint project of the United States, West Germany and Japan, was suddenly terminated. The second came this February with the decision to delay construction of the EDS (Exxon donor solvent) method pilot plant, another project for coal liquefaction depending on international cooperation.

Ministry of International Trade and Industry (MITI) and NEDO (New Energy Development Organization) circles, however, seem to have taken the calm view that this is "a natural result of the situation in which the United States finds itself."

The real problem now is that of how to formulate an independent Japanese liquefaction strategy. But because this is a time in which the interim long-term energy supply and demand forecast is being revised and the 1985 goal for new energy--primarily liquefaction of coal--is said to have undergone a "major downward revision" of more than 10 million kl from the earlier goal of 38.5 million kl, commercial expectations have been deflated. It is hardly possible for the private sector alone to pursue projects such as coal liquefaction, and positive, indirect aid from the government sector is now more necessary than ever.

The primary reason that the United States has postponed its coal liquefaction projects at this time is the collapse of crude oil prices which accompanied the worldwide decline in demand for oil. The result was the decision to slow down the development of alternative energy sources.

Moreover, the U.S. possesses abundant domestic petroleum, coal and oil shale resources, and has a broad range of options--including alternative sources of energy--for its total future energy supply. It can thus be assumed that there is little need to expend great effort promoting coal liquefaction just when the price gap between coal and crude oil is closing (that gap had been growing wider in recent years as crude oil prices shot upward). The postponement of coal liquefaction in the United States was a reasonable move.

But for Japan, which has scant domestic energy resources, the encouragement of alternative sources of energy is something which must be given full effort, no matter what the market conditions are for crude oil. The diversification of crude oil import sources and the promotion of alternative sources of energy to diversify risk have become even more important to Japan's economic security.

Consequently, MITI and NEDO have decided to reinforce Japan's strategy through unification of three domestic liquefaction projects. Previously the Sunshine Plan had covered parallel development of: (1) solvent extraction liquefaction technology, (2) solvolysis liquefaction technology, and (3) direct hydrogeneration liquefaction technology.

With regard to (1) solvent liquefaction, the Sumitomo group (Sumitomo Metal Industries and Sumitomo Coal Mining Co) is now operating a coal processing experimental plant which handles 1 ton per day. The (2) solvolysis method, which is one form of solvent liquefaction (it is characterized by the possibility of reactions with only atmospheric pressure in the reactor vessel), is being developed by the Kyushu Industrial Laboratory and Mitsubishi Heavy Industries; a 1-ton-per-day experimental plant is now in operation.

And as for (3) direct hydrogenation, Nippon Kokan KK, Mitsui Shipbuilding & Engineering and others are now operating a 2.4 ton per day experimental plant.

Thus, for each of the methods there is only an experimental plant with a capacity of 1 or 2 tons per day. Considering that a 250-ton-per-day pilot plant is already operating in the United States using the EDS method, for which Exxon is said to have decided a postponement, one cannot deny that Japan is far behind.

However, a technical analysis of the three methods shows that both the solvent extraction method and the solvolysis method use hydrogen, so there is no clear-cut difference separating the three.

Therefore, in light of the emerging strategy of focusing investment of talent and finances, and considering fiscal cutbacks on the basis of "administrative reform," there is growing support for "consolidation of the three methods into one." Both MITI and NEDO seem to have begun studies and analyses on consolidation into one method with a tentative target date of August, when the budget for the coming year is to be firmed up.

At present, Australian lignite liquefaction is the only international cooperation project for unaided "Hinomaru coal liquefaction," part of the Sunshine liquefaction plan. Japan Lignite Liquefaction Co (a private joint venture of five companies including Kobe Steel and Mitsubishi Chemical Industries) is now operating a half-ton-per-day experimental plant at Kobe Steel.

Current policy is to go ahead quickly with commercialization; work has begun on construction of a 50-ton-per-day pilot plant in Victoria, Australia, which is to begin operation in 1984. The total construction cost is to be

40 billion yen, of which NEDO is to disburse 12.3 billion yen for FY-82. NEDO is said to be strengthening its liquefaction strategy with a focus on two lines: this Australian lignite method and the three Sunshine methods. Study is also being given to reconstituting SRC-II as a completely Japanese project.

The biggest problems now are fostering a liquefaction industry and procurring funds. A commercially viable plant which processes in excess of 20,000 tons per day would require from 600 million to 1 trillion yen. The prerequisites are formation of a large market and cooperation between government and private sectors in procurement of funds.

In the case of international projects, procurement of funds in the dollar market is essential, and will require the efforts of the Japanese to whom coal liquefaction is most attractive. It is certain that, in the words of a MITI official, "What would take one year now will take 3 or 4 years in another decade."

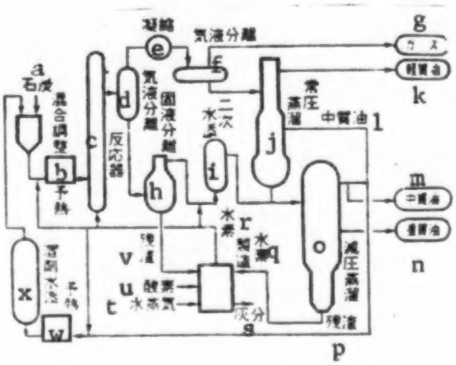


Diagram: Solvent Extraction Liquefaction Project

Key:

a. Coal
b. Preheating of mixture
c. Reactor
d. Gas/liquid separation
e. Condensation
f. Gas/liquid separation
g. Gas
h. Solid/liquid separation
i. Secondary hydrogenation
j. Atmospheric distillation
k. Light oil
l. Medium oil
m. Medium oil
n. Heavy oil
o. Vacuum distillation
p. Residue
q. Hydrogen production
r. Hydrogen
s. Ash
t. Steam
u. Oxygen
v. Residue
w. Preheater
x. Solvent hydrogenation

9601
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END

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30 June 1982

Japan Report

No. 155

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JAPAN REPORT

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ECONOMIC COOPERATION, ENERGY POLICY EXAMINED

Tokyo FAINANSU in Japanese Vol 17, No 12, Mar 82 pp 14-25

[Article by Akira Hiyoshi, an accounting official in the Accounting Bureau]

[Excerpts] Part I. Expansion of Economic Cooperation

Current Conditions of Japanese Economic Cooperation

1. Economic cooperation is generally considered to include both government and private cooperation. The value of Japan's actual economic cooperation in FY-80 was approximately $6.8 billion (refer to Table 1).

Japan's economic cooperation, including private contributions, recorded a high of $10.7 billion in FY-78. Since then, however, private export credits, direct investment, and some other items have declined by a large margin because of the economic slump, among other reasons. Actual economic cooperation in FY-80 was about 60 percent of that in FY-78.

2. On the other hand, official overseas development aid (ODA), which is most strongly sought by developing countries, shows a remarkable increase because of positive efforts by the Japanese Government.

In other words, Japan's actual ODA in FY-80 was $3.3 billion, a 25-percent increase relative to the previous fiscal year. It ranks Japan fourth, following the United States, West Germany, and France, among the 17 participating countries in the OECD's Development Assistance Committee (DAC). Compared with FY-75, just 5 years earlier. the dollar value of Japan's ODA has increased by about three times (ODA of DAC members doubled on the average), and the Japanese share of all DAC aid has increased by 50 percent (8 percent in FY-75 and 12 percent in FY-80) (refer to Table 2).

3. Japan's ODA consists of approximately 70 percent bilateral aid, which includes both bilateral grants and loans, and approximately 30 percent for multinational aid, which is Japan's contribution to international organizations. Of bilateral grants, slightly less than 60 percent is untied financial cooperation and the rest, slightly over 40 percent, is in the form of technical cooperation. Most bilateral loans are yen credits provided by the Overseas Economic Cooperation Fund (refer to Table 3).

Table 1. Japan's Actual Economic Cooperation (net expenditures; unit: millions of dollars)

区 (1) 分	1979年 (2)		1980年 (2)	
	金3額	構成比 4	金3額	構成比 4
(5) 援助総額 （対GNP比）	7,555.6 (0.75)	100.0	6,765.9 (0.65)	100.0
I (6) 政府開発援助（ODA） （対GNP比）	2,637.5 (0.26)	34.9	3,303.7 (0.32)	48.8
(7) 1. 二国間贈与	560.2	7.4	652.6	9.6
(8) 技術協力	241.9	3.2	277.8	4.1
(9) 無償資金協力	318.3	4.2	374.8	5.5
(10) 2. 二国間政府貸付	1,361.0	18.0	1,308.2	19.3
(11) 3. 国際機関への出資拠出等	716.3	9.5	1,342.9	19.8
(12) II その他政府資金協力（OOF）	210.1	2.8	1,478.0	21.8
(13) 4. 輸出信用（1年超）	△ 235.1	△ 3.1	822.9	12.2
(14) 5. 直接投資金融等	675.4	8.9	767.0	11.3
(15) 6. 国際機関に対する融資等	△ 230.2	△ 3.0	△ 111.9	△ 1.7
(16) III 民間ベース協力（PF）	4,708.0	62.3	1,984.2	29.3
(17) 7. 輸出信用（1年超）	642.5	8.5	73.7	1.1
(18) 8. 直接投資等（証券投資，対外貸付を含む）	3,405.8	44.9	1,566.3	23.1
(19) 9. 国際機関に対する融資等	640.7	8.5	317.8	4.7
(20) 10. 非営利団体による贈与	19.0	0.3	26.4	0.4
(21) 参考 輸出信用計 (22)	407.5	5.4	896.6	13.5
直接投資等計 (23)	4,081.2	54.0	2,333.3	34.5

Note: 1. The "total export credits" referred to is a total of export credits (exceeding 1 year) of "other official financial cooperation" and "private cooperation." In the same manner, "total direct investment" is a total of direct investments of "other official financial cooperation" and "private cooperation."
2. Figures in each column do not necessarily equal the total due to rounding.

Source: DAC Materials

Key:

(1) Classification
(2) Year
(3) Amount
(4) Ratio
(5) Total amount of assistance (relative to GNP in ( )).
(6) Official development aid (ODA) (relative to GNP in ( )).
(7) Bilateral grants
(8) Technical cooperation
(9) Untied financial cooperation
(10) Bilateral government loans
(11) Contributions to international organizations
(12) Other official financial cooperation
(13) Export credits (exceeding 1 year)
(14) Direct investments
(15) Loans to international organizations
(16) Private cooperation (PF)
(17) Export credits (exceeding 1 year)
(18) Direct investments (including investments in securities and overseas loans
(19) Loans to international organizations
(20) Grants by nonprofit organizations
(21) Reference
(22) Total export credits
(23) Total direct investment

Table 2. Official Development Aid of DAC Countries (actual expenditure)

(unit: millions of dollars)

区(1)分	金(2)額		対1975年比率 4(倍)	DAC中シェア(5)(%)		対GNP比(%)(6)	
	1975年3	1980年3		1975年3	1980年3	1975年3	1980年3
米(7)国	4,161	7,138	1.7	30.1	(28.8) 26.7	0.27	0.27
西(8)独	1,689	3,517	2.1	12.2	(14.2) 13.1	0.40	0.43
フ(9)ンス	2,093	(2,085) 4,053	1.9	15.1	(8.4) 15.1	0.62	(0.32) 0.62
日(10)本	1,148	3,304	2.9	8.3	(13.3) 12.3	0.23	0.32
英(11)国	904	1,781	2.0	6.5	(7.2) 6.7	0.39	0.34
オ(12)ダ	608	1,577	2.6	4.4	(6.3) 5.9	0.75	0.99
(13)ナダ	880	1,036	1.2	6.4	(4.2) 3.9	0.54	0.42
(14)その他(10か国)	2,363	4,370	1.8	17.0	(17.6) 16.3	0.41	0.38
合(15)計	13,846	(24,808) 26,776	1.9	100.0	(100.0) 100.0	0.36	(0.34) 0.37

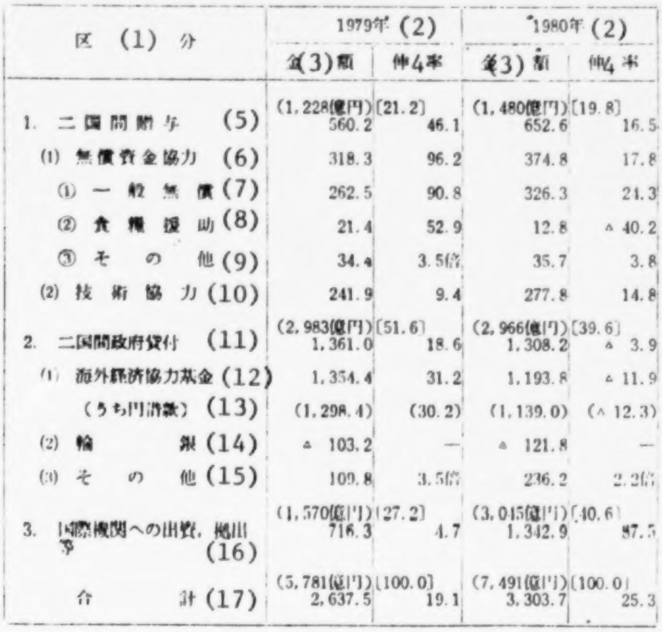
Note: Figures in ( ) indicate the case of France when ODA given to overseas prefectures and territories is excluded.

Key:

(1)	Country	(9)	France
(2)	Amount in dollars	(10)	Japan
(3)	Year	(11)	England
(4)	Ratio relative to 1975	(12)	Holland
(5)	Share of DAC total	(13)	Canada
(6)	Ratio relative to GNP	(14)	Others (10 countries)
(7)	United States	(15)	Total
(8)	West Germany		

Table 3. Main Items of Japan's Official Development Aid

(unit: millions of dollars and percent)



区 (1) 分	1979年 (2)		1980年 (2)	
	金(3)額	伸(4)率	金(3)額	伸(4)率
1. 二国間贈与 (5)	(1,228億円) 560.2	[21.2] 46.1	(1,480億円) 652.6	[19.8] 16.5
(1) 無償資金協力 (6)	318.3	96.2	374.8	17.8
① 一般無償 (7)	262.5	90.8	326.3	21.3
② 食糧援助 (8)	21.4	52.9	12.8	△ 40.2
③ その他 (9)	34.4	3.5倍	35.7	3.8
(2) 技術協力 (10)	241.9	9.4	277.8	14.8
2. 二国間政府貸付 (11)	(2,983億円) 1,361.0	[51.6] 18.6	(2,966億円) 1,308.2	[39.6] △ 3.9
(1) 海外経済協力基金 (12)	1,354.4	31.2	1,193.8	△ 11.9
(うち円借款) (13)	(1,298.4)	(30.2)	(1,139.0)	(△ 12.3)
(2) 輸銀 (14)	△ 103.2	—	△ 121.8	—
(3) その他 (15)	109.8	3.5倍	236.2	2.2倍
3. 国際機関への出資, 拠出等 (16)	(1,570億円) 716.3	[27.2] 4.7	(3,045億円) 1,342.9	[40.6] 87.5
合計 (17)	(5,781億円) 2,637.5	[100.0] 19.1	(7,491億円) 3,303.7	[100.0] 25.3

Note: Ratio relative to the total ODA is given in [ ].

Key:

(1)	Classification	(10)	Technical cooperation
(2)	Year	(11)	Bilateral government loans
(3)	Amount	(12)	The Overseas Economic Cooperation Fund
(4)	Rate of increase	(13)	Yen loans in ( )
(5)	Bilateral grants	(14)	Japan Export-Import Bank
(6)	Untied financial cooperation	(15)	Others
(7)	General untied	(16)	Investments in and contributions to international organizations
(8)	Food support	(17)	Total
(9)	Others		

Outline of the FY-82 Budget

Economic Cooperation Expenses

1. In response to the various international conditions surrounding Japan, the economic cooperation expenses appropriated in the FY-82 general account budget come to 471.2 billion yen, a large 10.8-percent increase over the previous fiscal year.

Table 4 is an outline summary of these expenses. Brief explanations of the main items follow.

Bilateral Untied Aid

In response to developing countries' requests for aid to improve basic living standards, funds to assist both economic development and the augmentation of food production have been increased. Aid for economic development is primarily for low-income developing countries and is intended to assist in the areas concerning basic needs of human life such as water, health, medical care, and education. Aid to augment food production is also for low-income developing countries and is intended to assist in purchasing food, fertilizer, and agricultural machinery.

Bilateral Technical Cooperation

Technical cooperation is intended to promote the self-help efforts of developing countries through technical transfer. It also includes the goal of developing and improving technology in developing countries.

In regard to the International Cooperation agency, the primary organ charged with carrying out Japan's technical cooperation, the number of trainees to be received from overseas, the number of specialists to be sent overseas through the program to dispatch specialists, and the number of Youth Overseas Cooperation Corps members to be sent overseas have been increased. The allowances of participants also have been improved. Funds for the establishment of an ASEAN "manpower building" center, a concept that Prime Minister Suzuki announced during his visit to five ASEAN countries in the spring of 1981, and construction of an international center in Okinawa have been newly appropriated in the FY-82 budget.

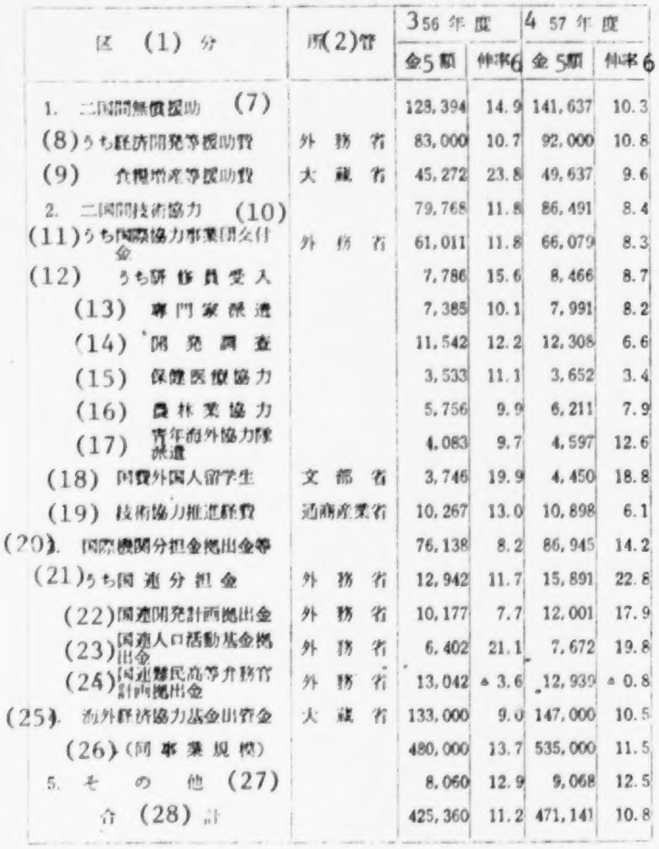
In addition, the number of new foreign students the Japanese Government will sponsor in FY-82 has been increased to 1,100 (950 in FY-81). Their allowances also have been improved.

Contributions Allocated to International Organizations

Japan continues to provide appropriate aid to international organizations such as the United Nations.

The rate of increase is especially high, because, in addition to the budget increases of the international organizations, the official exchange rate has been changed (217 yen per dollar in FY-81 but 229 yen per dollar in FY-82).

Table 4. Outline of Economic Cooperation Expenditures in the FY-82 Budget
(unit: millions of yen and percent)



区 (1) 分	所(2)管	3 56 年度		4 57 年度	
		金5額	伸率6	金5額	伸率6
1. 二国間無償援助 (7)		128,394	14.9	141,637	10.3
(8) うち経済開発等援助費	外務省	83,000	10.7	92,000	10.8
(9) 食糧増産等援助費	大蔵省	45,272	23.8	49,637	9.6
2. 二国間技術協力 (10)		79,768	11.8	86,491	8.4
(11) うち国際協力事業団交付金	外務省	61,011	11.8	66,079	8.3
(12) うち研修員受入		7,786	15.6	8,466	8.7
(13) 専門家派遣		7,385	10.1	7,991	8.2
(14) 開発調査		11,542	12.2	12,308	6.6
(15) 保健医療協力		3,533	11.1	3,652	3.4
(16) 農林業協力		5,756	9.9	6,211	7.9
(17) 青年海外協力隊派遣		4,083	9.7	4,597	12.6
(18) 国費外国人留学生	文部省	3,746	19.9	4,450	18.8
(19) 技術協力推進経費	通商産業省	10,267	13.0	10,898	6.1
(20) 国際機関分担金拠出金等		76,138	8.2	86,945	14.2
(21) うち国連分担金	外務省	12,942	11.7	15,891	22.8
(22) 国連開発計画拠出金	外務省	10,177	7.7	12,001	17.9
(23) 国連人口活動基金拠出金	外務省	6,402	21.1	7,672	19.8
(24) 国連難民高等弁務官計画拠出金	外務省	13,042	▲3.6	12,939	▲0.8
(25) 海外経済協力基金出資金	大蔵省	133,000	9.0	147,000	10.5
(26) (同事業規模)		480,000	13.7	535,000	11.5
5. その他 (27)		8,060	12.9	9,068	12.5
合 (28) 計		425,360	11.2	471,141	10.8

Key:

(1)	Classification
(2)	Jurisdiction
(3)	FY-81
(4)	FY-82
(5)	Amount in yen
(6)	Rate of increase
(7)	Bilateral untied aid
(8)	Including economic development aid expenditures
(9)	Including, augmentation of food production aid expenditures
(10)	Bilateral technical cooperation
(11)	Including grants to the International Cooperation Agency
(12)	Including reception of trainees
(13)	Dispatch of specialists
(14)	Development surveys
(15)	Health and medical care cooperation
(16)	Agriculture and forestry cooperation
(17)	Sending of Youth Overseas Cooperation Corps members
(18)	Japanese government-sponsored students
(19)	Technical cooperation promotion expenses
(20)	Contributions to international organizations
(21)	Including, contributions allocated to the United Nations
(22)	Contributions to the United Nations' Development Plan
(23)	Contributions to the United Nations' Population Activities Fund
(24)	Contributions to the United Nations' High Commissioner for Refugees Plan
(25)	Investment in the Overseas Economic Cooperation Fund
(26)	The scale of its projects
(27)	Others
(28)	Total
(29)	Ministry of Foreign Affairs
(30)	Ministry of Finance
(31)	Ministry of Education
(32)	MITI

The Overseas Economic Cooperation Fund

The Overseas Economic Cooperation Fund provides developing countries with the funds needed for industrial development and economic stability. Its scale of investments and loans has been expanded to 500 billion yen in direct loans and 35 billion yen for general items, a total of 535 billion yen (an 11.5-percent increase relative to the previous fiscal year). To finance operations, the OECF will receive 147 billion yen appropriated from the general account, borrow 207.2 billion yen from the Trust Fund Bureau, raise 13 billion yen in government guaranteed bonds, and use 167.8 billion yen of its own money.

2. As mentioned previously, economic cooperation expenses as a whole have been increased by a large margin in the FY-82 budget. Funds for individual items of economic cooperation no longer needed or now judged inappropriate have been reduced in order to obtain people's understanding and a consensus concerning economic cooperation even though Japan is currently undergoing desperate financial reconstruction. Savings and rationalization in the allocation of funds are considered in each case.

In accordance with the report of the Provisional Administrative Research Committee, measures have been taken to improve evaluation methods in order to conduct economic cooperation effectively as well as properly.

Official Development Assistance

1. As mentioned previously, due to an increase in economic cooperation expenses, the FY-82 general account budget related to ODA has been increased by 45.2 billion yen, 11.4 percent more than the previous year (refer to Table 5).

> (Note) Economic cooperation expenses in the general account and expenses related to ODA are not exactly the same. Of economic cooperation expenses, contributions allocated to international organizations such as the United Nations are only partially counted as ODA-related expenses. There are also some expenses that are not listed among economic cooperation expenses but are counted as ODA-related expenses.

The rate of increase in ODA-related expenses is 11.4 percent, which coincides with the annual average rate of increase necessary to achieve the mid-term goal for future ODA. This rate of increase shows our best effort is being made to achieve the mid-term goal in spite of the current economic difficulties.

> (Note) The mid-term goal for ODA is "to double the ODA-related expenses in the budgets of the latter 5 years of the 1970's in the first 5 years of the 1980's."

2. Internationally, ODA is a concept discussed on the basis of the actual record of a fiscal year. However, if we estimate FY-82's ODA expenses on the basis of ODA-related expenses as already defined, it amounts to 941.8 billion yen. Its ratio relative to GNP is 0.34 percent, which is slightly more than that of the previous fiscal year (refer to Table 5).

Table 5. Outline of FY-82 Official Development Aid

(unit: 100 million yen and percent)

区 (1) 分	(2) 事 業 費		(3) うち一般会計	
	4 56 年 度	5 57 年 度	4 56 年 度	57 5 年 度
1. 贈 (6) 与	(5.4) [51.3] 4,559	(3.2) [49.9] 4,704	(14.5) 2,581	(12.0) 2,890
(7) (1) 二国間贈与	(16.5) 2,149	(12.0) 2,407	(16.6) 2,117	(11.4) 2,358
(8) ① 経済開発等援助費	830	920	830	920
(9) ② 食糧増産等援助費	453	496	453	496
(10) ③ 技 術 協 力	865	991	833	942
(11) ④ そ の 他	1	—	1	—
(12) (2) 国際機関出資・拠出	(△2.8) 2,410	(△4.7) 2,297	(5.5) 464	(14.7) 532
(13) ① 国連等諸機関	414	469	414	469
(14) ② 国際開発金融機関	1,996	1,828	50	63
2. 借 (15) 款	(6.2) [48.7] 4,329	(8.9) [50.1] 4,714	(9.8) 1,384	(10.3) 1,527
(16) ① 海外経済協力基金	4,352	4,818	1,330	1,470
(17) ② 日本輸出入銀行	△ 227	△ 304	0	0
(18) ③ そ の 他	204	200	54	57
3. 合 (19) 計	(5.8) [100.0] 8,888	(6.0) [100.0] 9,418	(12.8) 3,965	(11.4) 4,417
(20) G N P 比 (%)	0.336	0.340		
(21) G N P (兆 円)	264.8	277.2		

Note: The ratio relative to total ODA in [ ] and the rate of increase over the previous year in ( ).

Key:

(1)	Classification	(12)	Investments and contributions to international organizations
(2)	Project expenses	(13)	Various organizations such as the United Nations
(3)	Including, from the general account	(14)	International development financing institutions
(4)	FY-81	(15)	Loans
(5)	FY-82	(16)	The Overseas Economic Cooperation Fund
(6)	Grants	(17)	Japan Export-Import Bank
(7)	Bilateral grants	(18)	Others
(8)	Economic development aid expenses	(19)	Total
(9)	Augmentation of food production aid expenses	(20)	Relative to GNP
(10)	Technical cooperation	(21)	GNP (unit in 1 trillion yen)
(11)	Others		

The share of general account funds in ODA-related expenses is approximately 40 percent. The remaining portion is funded by Fiscal Investment and Loan money and government guaranteed bonds. In FY-82, increases in the capital of international development financing institutions is unlikely because of delay in payment by the United States and other factors. Japan's investment in such organizations also cannot help but decrease from the previous year. In spite of such conditions, ODA-related expenses can maintain a high-level in the FY-82 budget. The reason is that the ODA-related expenses have received an extremely high rate of increase in the general account.

Future Subjects

1. As mentioned in the previous section, Japan's economic cooperation has increased sharply in recent years in spite of the fact that it, and ODA in particular, is based on budgetary funds and Japan is currently in a difficult financial situation.

However, advanced Western countries are now inclined to "review foreign aid." The Reagan administration of the United States especially is reviewing America's entire multinational aid policy and is taking an extremely cautious attitude toward a new increase in the capital of international development financing institutions.

Assistance to developing countries cannot be carried out by Japan alone. Effectiveness is achieved only with the cooperation of all countries. Especially in the case of international development financing institutions, it is important to maintain the principle of fair burden sharing among participating nations. Moreover, multinational aid occupies almost 30 percent of Japan's ODA. Consequently, there is a concern that the negative U.S. attitude toward international organizations will affect the actual achievements of Japan's ODA program. A positive attitude on the part of all countries, especially the United States, is desirable.

2. On the other hand, in spite of the rapid increase in Japan's ODA, the DAC is hoping even greater increases. However, Japan's ODA has reached a level comparable to those of other advanced nations in terms of dollars. Therefore, our future efforts should focus not on the amount of dollars but on the effective administration of ODA so that Japanese assistance is of true help to developing countries in developing their economies and improving welfare.

To the view which evaluates ODA only in terms of its ratio relative to GNP, the following counterpoints can be offered: 1) Since ODA should be conducted in consideration of the geographical and historical backgrounds of the supporting country, is it appropriate to base comparisons only on the GNP measure? (In the case of France, if ODA given to overseas prefectures and territories is excluded, its ODA relative to GNP equals that of Japan.) 2) Concerning a nation's capability to provide support, isn't it necessary to take into consideration the quality of its stock of domestic social capital such as housing and national income per capita of the supporting country? 3) At any rate, ODA does not have to be proportionate to GNP. Isn't it inevitable that the larger a country's GNP is the smaller its ratio relative to GNP will become?

(Although U.S. GNP and ODA are the largest in the world, the U.S. ratio of ODA relative to GNP is smaller than that of Japan.)

3. Furthermore, economic cooperation assumes self-help efforts on the part of the partner countries and must support such efforts. As aid increases, it does not remain within the level necessary to maintain basic living standards in the partner country. Although the need for self-help efforts has been increasing, the response to this problem by developing countries is still not necessarily sufficient.

In regard to this point, the mid-term goal for ODA states in its preamble that "as a precondition to achievement of the mid-term goal, we expect partner countries to improve further conditions for receiving assistance so that we can effectively support their self-help efforts toward economic and social development."

4. Finally, because ODA is based on budgetary appropriations, it is important that economic cooperation be conducted effectively and strictly and with due consideration for its relation to our national interest in order to obtain a sufficient understanding and consensus from the people.

Part II. Promotion of Energy Measures

Structure of the Energy Budget

1. Since energy measures require promotion from the long- and middle-term viewpoint, the demand for funds is expected to be enormous. Therefore, funds must be acquired so that energy measures can be promoted comprehensively and systematically. For this purpose, general sources of revenue as well as specified sources of revenue and user taxes based on the principle that beneficiaries should pay are fully taken into account in formulating the energy measures budget.

2. First, energy-related expenses to which the principle that the beneficiaries should pay is hard to apply (in other words, expenses required for basic research and administration of general energy policies) are appropriated from the general sources of revenue in the general account. In addition, a portion of the petroleum tax revenue, which is a source of revenue for petroleum and petroleum substitute energy measures, is transferred to the Special Account for Coal and Petroleum and Petroleum Substitute Energy Measures (the Coal and Petroleum Special Account).

3. In the Coal Account of the Coal and Petroleum Special Account, coal measures are financed by the Crude Petroleum Customs Duty.

In the Petroleum and Petroleum Substitute Account of the Coal and Petroleum Special Account, petroleum measures such as exploration and development of oil and petroleum stockpiles, and measures for petroleum substitute energy for uses other than electric power generation are financed by petroleum tax revenue transferred from the general account and a part of Crude Petroleum Customs Duty.

4. In addition, electric power source siting measures in the Electric Power Source Siting Account of the Special Account for Promotion of Electric Power Source Development and various measures for electric power source development by means of petroleum substitute energy in the Electric Power Source Diversification Account of the same special account are financed by the Tax for Promotion of Electric Power Source Development.

Outline of the FY-82 Budget

Taking into account the previously mentioned energy conditions, 563.2 billion yen has been appropriated in the general account for energy measures expenses in the FY-82 budget. It is a big 13.2 percent increase over the previous fiscal year, as in the case of economic cooperation expenses. For total energy measures expenses, which include special accounts, 922.6 billion yen has been appropriated, which is a 6.5-percent increase over the previous year.

An outline summary is given in Table 7 (for special accounts, refer to Table 8). The main items are briefly explained hereafter.

Petroleum provides more than half of Japan's energy supply. This condition is likely to continue for a while. On the other hand, because the international situation involving oil is extremely uncertain, as one of our energy measures, first of all, it is important to secure a stable supply of petroleum.

From this viewpoint, of all the energy measures expenses in the FY-82 budget, the greatest emphasis has been placed on the petroleum measures. In the Petroleum and Petroleum Substitute Energy Account of the Coal and Petroleum Special Account, 353.5 billion yen has been appropriated for petroleum measures. It has received the highest increase--15.7 percent above last year.

Petroleum Development

Promotion of exploration and development of oil and natural gas resources in Japan and overseas can be considered measures to secure stable supplies of oil.

Therefore, the exploration-related loans and investments of the Japan Petroleum Development Corporation continue to be promoted in the FY-82 budget. For these projects, 107.8 billion yen has been appropriated, a 10 percent increase over the previous year. The scale of the projects involving loans and investments has been expanded to 140 billion yen (116 billion yen in the FY-81 budget). These funds are expected to advance oil development activities that Japanese have been conducting in the Middle East (Abu Dhabi and Qatar), China (Bohai), and Canada (the Arctic Ocean). However, considering present financial conditions, the 140-billion-yen-scale of the projects is the result of suppressing as far as possible the ever-expanding demand for funds that accompanies satisfactory progress of the exploration projects. Incidentally, crude oil imports from fields developed by Japanese interests was approximately 9 percent of total demand in FY-80.

Table 7. Outline of FY-82 Energy Measures Expenditures
(unit: millions of yen and percent)

区 (1) 分	56 (2) 年度		57 (3) 年度	
	金 (4) 額	(5) 伸率	金 (4) 額	(5) 伸率
一般会計 (6)	497,489	17.3	563,195	13.2
(7) 原子力平和利用研究促進費	164,722	4.3	164,838	0.1
(8) 新エネルギー技術関係経費	6,918	△1.6	6,177	△10.7
(9) 省エネルギー 〃	2,911	△5.2	2,980	2.4
(10) 石油税財源石特繰入	318,000	26.2	385,000	21.1
(11) 国際原子力機関分担金等	2,085	12.8	2,176	4.4
その他 (12)	2,853	25.2	2,024	△29.1
特別会計 (13)	686,783	20.8	744,451	8.4
電源開発促進対策 (14)	171,873	20.5	184,226	7.2
電源立地勘定 (15)	69,463	16.0	71,932	3.5
電源多様化勘定 (16)	102,410	23.8	112,294	9.7
石炭並びに石油及び石油代替エネルギー対策 (17)	500,046	20.7	543,551	8.7
石炭勘定 (18)	138,745	6.0	136,250	△1.8
石油及び石油代替エネルギー勘定 (19)	361,301	27.5	407,301	12.7
石油対策 (20)	305,600	23.0	353,524	15.7
石油代替エネルギー対策 (21)	55,701	59.4	53,777	△3.4
国立学校 (22)	14,864	25.4	16,674	12.1
一般会計・特別会計純計 (23)	866,272	16.9	922,646	6.5

Key:

(1)	Classification
(2)	FY-81
(3)	FY-82
(4)	Amount in yen
(5)	Rate of increase
(6)	General account
(7)	Expenditures for the promotion of the study of the peaceful uses of nuclear power
(8)	New energy technology-related expenditures
(9)	Energy conservation technology-related expenditures
(10)	Transfers of petroleum tax revenue to the Coal and Petroleum Special Account
(11)	Contributions allocated to International Atomic Energy Agency
(12)	Others
(13)	Special account
(14)	Electric power source development promotion expenditures
(15)	Electric power source siting account
(16)	Electric power source diversification account
(17)	Coal measures and petroleum and petroleum substitute energy measures
(18)	Coal account
(19)	Petroleum and petroleum substitute energy account
(20)	Petroleum measures
(21)	Petroleum substitute energy measures
(22)	National schools
(23)	Net total of the general account and special accounts

Table 8. Summary of Energy-Related Special Accounts in the FY-82 Budget

Rate of increase relative to the previous year given in [ ]
and amount of FY-81 budget given in ( )

(unit: 100 million yen)

Crude Petroleum Customs Duty
640 yen/kℓ
the provisional portion of
110 yen/kℓ is to be extended

Tax revenue	1,450 (1,586)
Carried over	16 (114)
surplus	1,347 (1,273

103 (313)
(Coal Mining Industry Special Account and Petroleum and Pet leum Substitute Energy Special Account)

Petroleum Tax
3.5 percent

Transfer to Coal Mining Industry and Petroleum and Petroleum Substitute Energy Special Accounts	[21.1%] 3,850(3,180)
Carried over surplus, etc.	120(120)

Tax for Promotion of Electric Power Source Development--
0.3 yen/kWh

Tax revenue	1,028 (1,024)
Carried over surplus, etc.	95 (0)

Tax revenue	407 (405)
Carried over surplus,etc.	312 (290)

Coal Account

1.Rationalization and safety measures	481(542)
Subsidy for pit frame structure expansion and improvement projects	125(114)
Supplementary allowance for stabilization of the coal mining industry	97(95)
Subsidy to projects for maintaining mine safety	85(78)
2.Mining pollution measures	580(539)
Assistance to restoration of mining-damaged environments	502(471)
Investment in the mine damage corporation	13(6)

Petroleum and Petroleum Substitute Energy Account

(Petroleum Measures)

1. Development	1,345(1,201)
Investments and loans for exploration	1,088(990)
Petroleum and natural gas primary surveys	89(58)
Oil shale extraction	20(12)
Secondary and tertiary recovery technology	5(1)
International petroleum exchange center	10(7)
2.Stockpiles	2,002(1,692)
Official stockpile	1,491(1,307)
Tanker and other stockpiles	1,247(721)
Funding for official stockpiles	171(560)
Private stockpile	402(302)

Petroleum Substitute Energy Measures 1,660 (1,581)

(Petroleum Substitute Energy Measures)

1.Coal resources development	86(66)
Loans for overseas coal exploration	60(60)
Foreign coal development feasibility studies	8(6)
Coal resources development basic survey	18(0)
2.Measures to promote introduction of substitute energy	142(129)
Japan Development Bank loans (conversion to coal, a coal center, gas air conditioning, etc)	59(54)
Promotion of the introduction of substitute energy in small- and medium-size businesses	7(0)

Electric Power Source Diversification Account
[5.0%]

1.Measures to secure supply	145(123)
Hydroelectric power development	52(42)
Geothermal development	95(81)
2.Measures to promote introduction of substitute energy	65(107)
Verification of technology	40(71)
Assistance for construction of coal-burning power plants, etc.	21(33)
3.Technological development	198(182)
Solar energy-related technology	60(54)
Geothermal energy-related technology	42(42)
Coal energy-related technology	27(24)

Electric Power Source Siting Account

1.Grants for promotion of electric power source siting	379(397)
2.Special grants for electric power source siting	97(53)
Grants to areas around nuclear power plant facilities	64(30)
Grants to electric power exporting prefectures, etc.	33(23)
3.Grants to areas around hydroelectric power plant facilities	37(35)
4.Nuclear power plant safety measures, etc.	192(196)
Commissioning expenses	152(140
Subsidies	9(26)
Grants	31(30)
5.Others	14(14)

[table continued]

[Continuation of Table 8]

Coal mine area	87(86)	Petroleum	378(299)	Diffusion and promotion of solar systems	61(59)	High-efficiency gas turbines	51(49)		
Development and employment measures for coal producing areas	187(193)	LPG	24(3)	Local energy	14(14)	4.Nuclear power	681(580)		
Others	28(27)	Siting policy grants	105(80)	3.Technological development, etc.	297(350)	Development of new types of power reactor (FBR,etc.)	242(234)		
		3.Technological development	188(163)	Coal liquefaction technology	169(235)	Reprocessing-related technology	271(215)		
		Heavy oil cracking technology	52(57)	Coal production and utilization technology	41(35)	Uranium enrichment-related technology	67(62)		
		Practical application of heavy oil processing technology	30(11)	Assistance for practical applications of technology	29(29)	5.Others	34(32)		
		New fuel oils	39(42)	Jointly applied technology	13(12)				
		Others	67(53)						
Total	[Δ1.8%] 1,363(1,387)	Total	[15.7%] 3,535(3,056)	Total	[Δ3.5%] 538(557)	Total	[9.7%] 1,123(1,024)	Total	[3.5%] 719(695)

([8.7%]

Total of coal mining industry and petroleum and petroleum substitute energy special accounts
5,436(5,000

[7.2%]

Total of electric power source special account 1,842(1,719)

Total of energy-related special accounts [8.3%]
7,278(6,719)

Within Japan, the Japan Petroleum Development Corporation plans to proceed with basic surveys for domestic petroleum and natural gas resources (8.9 billion yen for primary geophysical investigations and primary drilling).

Development of technology related to petroleum development is also taken into consideration. Research and development on oil shale development technology (2 billion yen), which started in FY-81, and secondary and tertiary recovery technologies, which are expected to raise the recovery rate for crude oil by a large margin (500 million yen), are also to be promoted.

Petroleum Stockpiles

The case of unpredicted emergencies in which petroleum supplies are cut off must be provided for by stockpiling petroleum on a short-term basis. In Japan private oil companies maintain 90-day stockpiles and the Japan Petroleum Development Corporation maintains an official stockpile.

As a result, Japan's oil stockpiles at the end of last year were about 63 million kiloliters (101-day supply) in the private-sector stockpile and 11 million kiloliters (17-day supply) in the government's stockpile, for a total of approximately 74 million kiloliters (118-day supply).

The private-sector stockpile exceeds by far the 90-day supply which is the quantity designated in the Petroleum Stockpile Act. This reflects the current easing of the international oil supply.

Considering the facts that the average stockpile of countries participating in the International Energy Agency (IEA) was 161 days as of April 1981 and that Japan greatly depends on oil imports, however, this 118-day stockpile can never be sufficient.

Therefore, the government is trying to maintain the 90-day stockpile structure for the private sector. At the same time, it ultimately intends to increase its own stockpile to 30 million kiloliters. In order to achieve this goal, the government stockpiling bases are being constructed by the Japan Petroleum Development Corporation.

In FY-82, of the government stockpiling bases already under construction, those in Mutsuogawara District and Tomakomai East District are to be promoted. As for stockpiling bases in the planning stage, the start of construction is to be promoted in the Shiroshima District, Fukui Harbar District, Kamigoto District, and Akita District bases. In order to finance purchase of land for construction of stockpiling bases in these districts, 17.1 billion yen has been appropriated for the Japan Petroleum Development Corporation's stockpiling projects.

In accordance with the report of the Provisional Administrative Research Committee, base construction expenses of the stockpiling projects are to be financed by private sector funds starting in FY-82. Consequently, 116.2 billion yen for base construction will not be appropriated from the Coal and Petroleum Special Account but financed by commercial loans. As a result, the amount of petroleum tax revenue transferred from the general account to the Coal and Petroleum Special Account has been reduced.

As a temporary measure until the completion of the official stockpiling bases, official stockpiles are being stored in borrowed tankers and private tanks. In FY-82, 124.7 billion yen has been appropriated to increase official stockpiles by approximately 1.5 million kiloliters. (Incidentally, taking advantage of the easing of oil supplies internationally, official stockpiles are being increased by 3.5 million kiloliters.) As a result, official stockpiles at the end of FY-82 are expected to be about 12.5 million kiloliters (about 19-day supply).

Next, private petroleum companies are legally obliged to stockpile a 90-day supply. For the portion exceeding the stock necessary for normal operation (usually a 45-day supply) of a 90-day stockpile, the government loans the companies funds to purchase the oil and to build storage facilities. In order to supplement the interest payments on the loans, 32.6 billion yen has been appropriated.

The Oil Stockpile Act was revised in FY-81. The revised law requires private companies to establish a 50-day stockpile of LPG by FY-88 (a 20-day stockpile of LPG is required in FY-82). The assistance equivalent to the case of oil stockpiling projects is to be provided for LPG stockpiling projects too.

Intermediate Fraction Measures

While the quality of imported crude oil has been becoming heavier, the demand for petroleum products tends to be for medium or light grades. Assuring stable supplies of the petroleum products such as kerosene that are used in people's daily lives is currently the most important subject of petroleum policies. For this reason, budget appropriations have been made for intermediate fraction measures. These measures concern both the supply and demand aspects of lighter oil products such as the development of heavy oil cracking technology (5.2 billion yen), development of new fuel oils technology (3.9 billion yen), and development of technology to utilize residual heavy oils (3 billion yen).

> (Note: The petroleum measures and petroleum substitute energy measures which are described next are financed by the Coal and Petroleum Special Account. Transfer from the general account to the Petroleum and Petroleum Substitute Energy Account in the Coal and Petroleum Special Account have been increased by 67 billion yen, a large increase of 21.1 percent over the previous year. This is due to a decrease in revenue from the Crude Petroleum Customs Duty, another source of revenue to finance petroleum and petroleum substitute energy measures. This account's expenditures have been increased by only 12.7 percent. Examining the reasons for the increase, expenditures for the petroleum substitute energy measures are down, while expenditures for petroleum measures are up. The main items receiving increases are loans and investments for exploration and the government stockpiling. These two items are special cases in that exploration projects are joint ventures with oil-producing countries, and that official stockpiles need to be increased systematically. Incidentally, the revenue from the petroleum

tax is expected to be 434 billion yen in FY-82. Of that, 385 billion yen is to be transferred to the Coal and Petroleum Special Account. The difference of 49 billion yen will remain in the general account to finance other expenditures.

Petroleum Substitute Energy Measures

Japan depends on oil for approximately 70 percent of its primary energy supply. Moreover, Japan depends on imports for almost all its oil requirements. This fact, along with the unstable international oil situation, defines the vulnerability of the Japanese energy supply structure.

Under these conditions, targets for petroleum substitute energy supplies were determined in November 1980 as specified in the Law Concerning Promotion of Development and Introduction of Petroleum Substitute Energy. The ratio of petroleum substitute energy such as nuclear power, coal, and LNG to the total energy supply should rise to about 50 percent by FY-90 (it was about 35 percent in FY-80).

Based on this target, 166.1 billion yen has been appropriated in the special accounts (the Petroleum Substitute Energy Account and the Electric Power Source Diversification Account) in the FY-82 budget in order to improve petroleum substitute energy measures. It is a 5.1-percent increase over the previous year. In addition, 171 billion yen has been appropriated for nuclear power and other new energy-related expenses in the general account (a 0.4 percent decrease from the previous year).

Petroleum Substitute Energy Measures in the Coal and Petroleum Special Account

In the Petroleum Substitute Energy Account of the Coal and Petroleum Special Account, in order to promote development and utilization of petroleum substitute energy as a primary energy, 53.8 billion yen has been appropriated for exploration and development of foreign coal, conversion of oil-using industrial facilities to the use of petroleum substitute energy, diffusion of solar systems, development of coal liquefaction and gasification technologies, and expenses related to local energy development and utilization measures (55.7 billion yen in FY-81).

Petroleum Substitute Energy Measures in the Special Account for Promotion of Electric Power Source Development

At present over 40 percent of Japan's electric power is generated from petroleum. In order to reduce future petroleum dependency, development and utilization of various alternative electric power sources must be promoted. For this purpose, 112.3 billion yen has been appropriated in the Electric Power Source Diversification Account of the Special Account for Promotion of Electric Power Source Development (102.4 billion yen in FY-81).

The main contents are aids to research and development of utilization technologies for petroleum substitute energy such as hydroelectric power, coal thermal energy, geothermal energy, solar energy, and nuclear power as electric power sources and the construction of power plants that use petroleum substitute energy. In addition, funds and aid are given to the Power Reactor and

Nuclear Fuel Development Corporation for construction of a prototype fast breeder reactor and development of technologies related to reprocessing of used nuclear fuel.

Petroleum Substitute Energy Measures in the General Account

Nuclear power will play an important role in our future energy supply. Development and utilization of nuclear power continues to be promoted. To promote study of peaceful uses of nuclear power, 164.8 billion yen has been appropriated in the general account (a 0.1 percent increase from the previous year).

As mentioned before, 68.1 billion yen has been appropriated for nuclear power-related expenses in the Electric Power Source Diversification Account of the Special Account for Promotion of Electric Power Source Development. Therefore, nuclear power-related expenses total 233 billion yen (a 4.6 percent increase over the previous year). An outline summary is given in Table 9.

Concerning new energies such as solar energy, goethermal energy, coal energy, and hydrogen energy, the so-called "Sunshine Plan" has been carried out since FY-74 for the purpose of securing future energy supplies through development of new forms of energies.

In the FY-82 budget, a total of 41.6 billion yen (6.2 billion yen in the general account, 19.2 billion yen in the Coal and Petroleum Special Account, and 16.2 billion yen in the Special Account for Promotion of Electric Power Source Development) has been appropriated for expenses related to the "Sunshine Plan" (a 23.7 percent increase over the previous year). The solar power generation, research and development of a brown coal liquefaction project in Australia, and a nationwide survey for geothermal resources are to be promoted (refer to Table 10).

Energy Conservation Measures

In order to insure a stable balance between energy supply and demand, it is necessary to promote development of energy conservation technologies as well as making efforts to reduce energy consumption in every area of industry and daily life.

For this reason, the so-called "Moonlight Plan" has been carried out since FY-78. In the FY-82 budget, a total of 9.5 billion yen (3 billion yen in the general account, 300 million yen in the Coal and Petroleum Special Account, and 6.1 billion yen in the Special Account for Promotion of Electric Power Source Development) has been appropriated for expenses related to the "Moonlight Plan" (a 3.6 percent increase from the previous year). In addition to the large-scale energy conservation technology research and development projects currently in progress, research and development of an all-purpose Sterling engine will be initiated (refer to Table 11).

Table 9. Outline of the Nuclear Power-Related Budget

(unit: millions of yen and percent)

(1)事　項	56年度 2	57年度 3	(4) 57年度計画の主要項目
安全研究の推進 (5)	17,504	17,055	① 工学的安全研究 (17)
(6)一般会計	14,342	15,432	② 環境放射能安全研究 (18)
(7)特別会計	3,161	1,623	③ 新型動力炉の安全研究 (19)
新型動力炉の開発 (8)	66,709	73,255	① 高速増殖炉の開発（原型炉「もんじゅ」の建設，実験炉の運転） (20)
(6)一般会計	43,242	48,995	
(7)特別会計	23,467	24,260	② 新型転換炉の研究開発 (21)
(9) 核燃料サイクルの確立	70,446	63,490	① ウラン資源海外調査探鉱 (22) ② ウラン濃縮技術の研究開発 (23)
(6)一般会計	41,238	27,265	③ 再処理技術開発，放射性廃棄物処理処分技術開発 (24)
(7)特別会計	29,208	36,225	
核融合の研究 (10)	36,320	41,795	① 臨界プラズマ試験装置（ＪＴ-60）の建設 (25) ② トリチウム取扱技術の研究開発 (26) ③ 日米核融合協力 (27)
原子力船の研究開発 (11)	6,856	7,197	① 原子力船「むつ」の新定係港の整備 (28) ② 改良船用炉の研究開発 (29)
多目的高温ガス炉の研究開発 (12)	4,954	5,455	① 大型構造機器実証試験ループの建設 (30) ② 実験炉の詳細設計 (31)
(13) 原子力発電所安全対策			① 安全審査・検査の安全行政 (32)
(7) 特別会計	2,559	2,848	② 被ばく低減化対策 (33)
(14) 原子力発電技術開発等の推進			① 軽水炉改良技術確証試験等 (34) ② 廃炉対策 (35) ③ 原子力発電支援システムの開発 (36)
(7)特別会計	2,481	4,476	④ 中小型軽水炉の開発利用の検討 (37)
(15) 基礎研究	30,794	30,409	研究炉の運転経費 (38)
(6)一般会計	30,566	30,085	
(7)特別会計	228	324	
合 (16) 計	(9.7) 222,665	(4.6) 232,971	
(6)一般会計	164,722	164,838	
(7)特別会計	57,943	68,133	

Note: 1. Items partially overlap.
2. The rates of increase from the previous year are indicated in ( ).
3. Items not divided into general account and special account expenditures are general account expenditures only.

[Key on next page]

[Key to Table 9]

(1) Item
(2) FY-81
(3) FY-82
(4) Main items in the FY-82 plan
(5) Promotion of safety studies
(6) General account
(7) Special account
(8) Development of new type power reactors
(9) Establishment of a nuclear fuel cycle
(10) Studies of nuclear fusion
(11) Research and development of nuclear ships
(12) Research and development of multipurpose high-temperature gas reactors
(13) Nuclear power plant safety measures
(14) Promotion of nuclear electric generation technology
(15) Basic research
(16) Total
(17) Safety studies in terms of mechanical engineering
(18) Safety studies on environmental radiation
(19) Safety studies on new types of power reactors
(20) Development of fast breeder (construction of the "Monju" prototype and operation of an experimental reactor)
(21) Research and development of new type converters
(22) Overseas surveys and exploration of uranium resources
(23) Research and development of uranium enrichment technology
(24) Development of reprocessing technology and development of radiation waste treatment and disposal technology
(25) Construction of a critical plasma testing facility (JT-60)
(26) Research and development of tritium handling technology
(26) Japan-U.S. nuclear fusion cooperation
(27) Maintenance of the new designated mooring port for the nuclear ship "Mutsu"
(28) Research and development of a reactor for improved ships
(29) Construction of a demonstration loop for large structural apparatus
(30) Detailed design of an experimental reactor
(31) Administration of safety regulations; safety examinations and inspections
(32) Measures to reduce radiation exposure
(33) Demonstration of improved technology for light water reactors
(34) Abandoned reactor measures
(35) Development of nuclear power electric generation support systems
(36) Development of small- and medium-sized light water reactors and studies of their uses
(37) Operating expenses for research-use reactors

Table 10. Outline of the Sunshine Plan-Related Budget

(unit: millions of yen and percent)

Item	FY-81	FY-82
Solar energy	7,962	8,711
Geothermal energy	9,223	9,492
Coal energy	13,514	20,637
Hydrogen energy	948	923
Comprehensive study	1,233	1,067
International cooperation projects	668	674
Other	111	132
Total	(17.5) 33,659	(23.7) 41,636
General Account	6,932	6,222
Special Account	26,727	35,414

Note: The rate of increase from the previous year is given in ( ).

Table 11. Outline of the Moonlight Plan-Related Budget

(unit: millions of yen and percent)

Item	FY-81	FY-82
Research and development of large-scale energy conservation technologies	8,316	8,473
Magneto hydrodynamic (MHD) electric generation	624	592
High-efficiency gas turbines	5,920	6,035
New type battery electric power storage systems	646	858
Fuel battery electric generation technology	239	618
All-purpose Sterling engines	0	275
Recycled heat utilization technology systems	887	95
Subsidy for development of energy conservation technology	467	669
Other	380	348
Total	(17.8) 9,163	(3.6) 9,490
General account	2,956	3,025
Special account	6,207	6,466

Note: The rate of increase over the previous year is given in ( ).

Electric Power Source Siting Measures

Moreover, since future demand for electric power is expected to increase, it is necessary to promote electric power source siting beginning with nuclear power plants in order to secure adequate electric power supplies.

However, in recent years actual electric power source siting has tended to be delayed because of difficulties in negotiations with local residents.

For this reason, various measures are taken in the FY-82 budget to promote additional industrial development in electric power source areas. The use of Grants for Electric Power Source Siting Promotional Measures has been expanded to industrial promotion facilities. Measures are taken to improve the financing system by allowing the use of Grants to Electric Power Exporting Prefectures to attract enterprises. In addition, public acceptance measures such as public relations activities have been improved further in order to promote people's understanding and cooperation for the siting of electric power sources. For these purposes, 71.9 billion yen, a 3.5 percent increase over the previous year, has been appropriated in the Electric Power Source Siting Account of the Special Account for Electric Power Source Development.

Coal Measures

Concerning coal measures, domestic coal production continues to be maintained. Strengthening the financial base of the domestic coal mining industry, maintenance of mine safety, and mining pollution measures are all promoted. For these purposes, 136.3 billion yen, a 1.8 percent decrease from the previous year, has been appropriated in the Coal Account of the Coal and Petroleum Special Account.

The reason for the budget decrease is the Provisional Administrative Research Committee recommendation that "the coal mining industry should become self-supporting." Grants to increase coal output and grants for coking coal storage and sales promotion measures are abolished. In addition, funds required for loans administered by the New Energy Development Organization to modernize facilities are to be financed with commercial loans instead of by the government. Incidentally, if we add commercial loans by the New Energy Development Organization and the expenses for the primary survey of coal resources development in the Petroleum Substitute Energy Account, the actual scale of expenditures for coal measures is 145.1 billion yen, a 4.6 percent increase from the previous year.

The seven coal-related laws which expire in FY-81 such as "the Coal Mining Industry Special Account and the Petroleum and Petroleum Substitute Energy Special Account Act" and "the Temporary Measures for Rationalization of Coal Mining Industrial Act" are expected to be extended.

Future Subjects

1. Energy measures should be carried out systematically from a long-term perspective. The funds required for these measures will be enormous. On the other hand, the benefits of energy measures are ultimately returned to the

users and consumers of energy. Therefore, the funds needed to finance these measures must be collected from users and consumers in accordance with the degree of benefit.

2. However, this kind of special financial resource system creates various problems from the standpoint of integrated and efficient financial management.

At present, expenses related to energy measures are mainly financed by special sources of revenue because of the characteristics of energy measures and the difficult financial condition. Considering the problems accompanying the special financial resource system mentioned above, it is necessary to rationalize expenditures and pay constant attention to keeping in harmony with the general financial situation in managing revenues from special sources.

In other words, the scale of energy measures expenditures should be determined not by revenues but on the basis of the true necessity and urgency of the measures and with regard for a balance relative to other measures.

3. From this standpoint, energy measures should not be carried out across the board hereafter, but they need to be conducted efficiently with consideration for the following points.

First of all, energy measures involve the security of the country's petroleum supply and utilization of LNG and alternative forms of energy such as nuclear power in the short term, establishment of methods to utilize new forms of energy such as coal liquefaction in the mid-term, and development of nuclear fusion in the long-term. Therefore, it is necessary to carry out energy measures systematically and on a thoroughly realistic basis. Next, as for development of technologies related to petroleum and petroleum substitutes, the government should conduct research which the private sector could conduct only with difficulty. Even in such cases, it is necessary to determine the priority and contents of each development project and to examine strictly the required cost, the effect on energy supplies, the probability of successful completion, and furthermore, possible nonfinancial obstacles facing each kind of energy and its developmental process.

In order to do so, the market mechanism and the managerial judgment of the private sector must be utilized as much as possible. It is feasible to introduce a system that activates an automatic adjustment mechanism by asking the private sector to share the research and development burden and increasing the private sector's degree of burden sharing in accordance with the progress of a technology's development.

Alternative energy should be introduced primarily through the voluntary efforts of the private sector. Even in cases when some incentives are necessary, it is appropriate, as stated in the report of the Provisional Administrative Research Committee, to utilize the market mechanism and to limit incentives to those of a financing kind.

4. Concerning concrete measures, the following items need to be examined at present.

First, concerning loans and investments for exploration in the petroleum supply measures, the cost of self-development and the balance of oil supply and demand must be weighed as stated in the report of Provisional Administrative Research Committee and strict selections must be made so that truly promising projects can be financed. At the same time, even when managing joint projects with oil-producing countries, the progress of the projects must be in accordance with our financial situation. In the case of joint projects further adjustments can be expected by asking the private sector to assume an appropriate share of the risk burden.

Second, concerning development of oil-related and oil substitute-related technologies, exploring the likelihood of development of various technologies necessitates the execution of many development projects simultaneously and coverage of rather wide areas in the initial stage of development. As projects progress, however, it is necessary to nail down the most promising ones by strictly evaluating the results and flexibly selecting the projects. Certain projects for development seem to have reached the stage at which such examinations should begin.

5. Finally, at any rate energy problems accompany uncertainty. Therefore, it is most important for the promotion of energy policies that people have a common recognition of the importance of energy problems.

Consequently, in order to promote energy policies smoothly in the future, financial measures such as grants to plant sites may still be necessary, as typically seen in the case of nuclear power plant siting. However, advancing public relations measures to increase the public's correct understanding of energy issues seems to have become more important.

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BIOLOGICAL CELL FUSION, NUCLEAR TRANSPLANTATION DISCUSSED

Tokyo KAGAKU SHIMBUN in Japanese 5 Mar 82 p 5

[Text] Development of New Biological Resources by Cell Fusion and Nuclear Transplantation

> The Ministry of Agriculture, Forestry and Fisheries (MAFF) will carry out "development of new biological resources by cell fusion and nuclear transplantation" with a research and development fund totalling approximately 1 billion yen under a 5-year plan beginning in FY-82. This large-scale project consists of three topics: "development of cell fusion application techniques for breeding crop plants, algae, and fungi," "development of cell line functional modification techniques by cell fusion," and "development of animal cloning and breeding techniques by nuclear transplantation." The work will be carried out by the 12 experimental research organs under the jurisdiction of the Agriculture, Forestry and Fisheries Research Council of the MAFF, national universities, and private firms in a collaborative effort of government, academia, and industry. The major goals of this project are: 1) to create agricultural crops having superior characteristics such as cold resistance, insect resistance, etc, by cell fusion of closely related species; 2) to enable the mass production of livestock antibodies and high purity vaccines by using the cell fusion technique; 3) to endow the homing ability to fish or to create a superior cocoon by exchanging the nucleus of an ovum with the nucleus of a cell from fish and insects; and 4) to enable cloning and mass production of superior strains by exchanging the nucleus of an ovum of livestock with the nucleus of other cells. As explained, the achievements of this project are expected to bring about increased production of agricultural crops, livestock, and prime fish and will become the foundation for solving the food problem facing the 21st century.

Cell Fusion

Protoplast Preparation First

The breeding of agricultural corps or livestock has been practiced since early days by mating. And, in recent years, research and development in breeding have been carried out by using chemical substances, radiation, cell fusion, etc. Cell fusion is a totally different technique from mating or the use of chemical substances, irradiation with radioactive rays, etc. Its main purpose is to strive for increased production of food, etc by fusing cells of different living organisms to endow cold resistance, insect resistance, humidity resistance, etc to agricultural crops, to create superior milk cows, and to endow a thermophilic character of homing ability to fish.

Efforts will be made to increase production naturally by providing agricultural crops and forest trees with cold resistance, insect resistance, humidity resistance, etc. At the same time, if greenhouse heat becomes unnecessary due to improved cold resistance, it will also result in energy-saving; insect resistance will make agricultural chemicals unnecessary whereby both resource-conservation and energy-saving result. Thus, it will be killing two birds with one stone, resulting in increased food production and resource- and energy-conservation.

In order to perform cell fusion of plants or microorganisms, the thick cell wall of a cell must be dissolved first with a special enzyme to prepare a "protoplast," a cell enveloped only in a thin cell membrane.

Cell fusion was successfully performed for the first time in the world by Professor Y. Okada of the Research Institute for Microbial Diseases of Osaka University. About 25 years ago, he succeeded in a cell fusion experiment by fusing human cells mediated by Sendai virus. Also, protoplast was prepared for the first time in the world at the Institute for Plant Virus Research of MAFF. Thus, Japan possesses a forerunner base for cell fusion.

Induce Division and Redifferentiation

MAFF has succeeded in developing "hakuran," a hybrid between celery lettuce and cabbage. And, 4 years ago, Dr Melchers of the Max Planck Institute in West Germany produced a hybrid "pomato" from tomato and potato. However, it is still an intermediate product that does not bear seeds. The purpose of developing the pomato is an attempt to increase tomato production in cold regions by introducing the potato's cold resistant character into the tomato; the idea is not to harvest both tomatoes and potatoes simultaneously.

Cell fusion is meaningless unless the initially fused protoplast divides and multiplies.

Cell multiplication is carried out until it reaches a cellular mass called "callus." The next barrier is to skillfully redifferentiate the plant body from the callus stage (by hormone injection, etc).

Then, the next step is to produce fertile seeds (germinating seeds). In this research and development, a technique such as heterosis being used in the United States for corn, is not used.

Regarding the "development of cell fusion application techniques for breeding crop plants, algae, and fungi," the plan is: 1) to improve the techniques for preparing and fusing protoplasts, and 2) to develop a breeding technique by cell fusion.

Research has been conducted in the past regarding the technique to prepare plant or fungal protoplasts. However, in order to improve the preparation technique for protoplasts that are more suitable for fusion, plants as well as kinds of enzymes used in the preparation of protoplasts, operating conditions, and cultivating conditions are to be reevaluated. In addition, conditions for fusion, cultivating conditions for fused cells, and chemicals such as hormones to be added will be studied in order to obtain basic knowledge regarding the preparation of protoplasts and improvement in the fusion technique.

This research and development will be conducted by the Institute for Plant Virus Research and the National Food Research Institute of MAFF, and part of it will be commissioned to the Faculty of Fisheries at Kagoshima University. Private firms are participating in this project generally in the form of collaborative research.

Development of Cell Fusion Breeding Technique

"Development of a breeding technique by cell fusion" has the following characteristics: in the case of conventional breeding by mating, useful characters could not be introduced from a species that cannot be interbred. However, in cell fusion, as in the case of gene splicing, useful genes can be introduced into a species from another with which it cannot mate. Even in the case of fusion of species that do not interbreed, the latitude of mutation is extended by diploid or heteroploid formation of the chromosomes, and the function of useful genes can be enhanced. Therefore, the basic technique related to the application of cell fusion to breeding will be developed, while new breeding materials will be grown. In some crops, a new variety or new lines will be formed.

The target plants in this research include seed propagation plants (major crops, vegetables), vegetative propagation plants (potatoes, flowers, fruits, special use crops, trees), and fungi and algae (edible fungi, algae).

As for the technical development for a stable supply of "major crops," priority research has been conducted all along. With respect to the application of the new technology, basic research has been advanced such as the breeding of rice plants by another culture (tips of spikes are dipped in nutrient solution for cultivation) and the production of individuals from protoplasts of various crops such as rice plants and soy beans. Having these techniques to stand on, this research is attempting to produce new breeding material by cell fusion of the rice plants, soy beans, etc, among the crop species or with related species to introduce genetic characters such as humidity resistance, cold resistance, heat resistance, insect resistance, etc. The research will be conducted by the National Institute of Agricultural Science.

Interspecific and Intergeneric Hybrids

The breeding of "vegetables" is basically done by mating. However, because no embryo develops in the case of interspecific crossing, a new technique was developed to perform embryonic tissue culture and hakuran (hybrid between celery lettuce and cabbage) was bred, thus responding to versatile social needs. In this research, cell fusion will be performed with Brassicaceae vegetables to develop a technique for producing interspecific and intergeneric hybrids.

In other words, the hybridization of radish and cabbage is targeted for the production of a new crop; and a production of fused individuals will be attempted by combining kale, brown mustard, radish, cabbage, eggplant, etc, in an effort to accumulate the insect-resistant genes possessed by each vegetable species and to produce the quality satisfying market demand. The research will be conducted mainly by the Vegetables Research Station of MAFF, and the basic research will be conducted at the Faculty of Sciences of Hokkaido University and the Agricultural Research Laboratory of Tohoku University. Research on Agricultural Research Laboratory of Tohoku University. Research on Solanaceae will be commissioned to the Central Research Laboratory of the Monopoly Corporation.

Among the tuber crops, cross-breading has been practiced with sweet potatoes and white potatoes in the region where the plant flowers bear seeds. In the case of taro and yam, since perfect flowers cannot be obtained and no seeds are produced, breeding has been practiced by selection of variant individuals. In this research, fusion will be attempted first between varieties and strains and new crop plants and to develop new breeding techniques. The target for the yam is to obtain a new strain. The research will be conducted at the National Institute of Agricultural Sciences of MAFF, the Hokkaido Agricultural Experimental Station, and the Vegetables Research Station. Among the flowers, chrysanthemum demonstrates either a higher order polyploidy or heteroploidy in the number of chromosomes, fertile seeds cannot be obtained, and many of them cannot be bred by mating. In this research, cell fusions will be carried out between varieties, closely related species, and instantly related species in an attempt to obtain versatile color, shape, cultivation adaptability, etc, and to produce new lines. The research will be conducted at the Vegetables Research Station.

Aiming at Expanded Adaptability of Trees

It used to be difficult to separate the protoplast of perennial crop plants such as "fruit trees." However, in recent years, this has been successfully accomplished with citrus fruits, apples, pears, etc. In this research, the goal is to establish a technique for preparing protoplasts of citrus fruits, apples, pears, peaches, etc, to perform cell fusion between the varieties and closely related species in order to elucidate chromosomal behavior associated with individual differentiation and to produce fused individuals. The research will be conducted mainly by the Fruit Research Station of MAFF.

Among the "special use crop plants," the protoplast of the mulberry tree was separated, but an individual has not been produced. In this research, an attempt will be made to study a cell fusion technique between the varieties and closely related species to produce individuals by cell fusion. The research will be conducted by the Sericultural Experiment Station of MAFF.

Among the trees, individuals were regenerated from protoplasts in eight varieties of genus Populas: silver poplar, Japanese aspen, Japanese poplar, common cottonwood, etc. The genus Populas includes species that are difficult to root from cuttings and those that are easily rooted, those suited for upland areas and those suited for fertile land. In this research, efforts will be made to establish a regeneration and differentiation technique of individuals from fused cells obtained by combining the above species and to obtain hybrid plants for expanded adaptability. The research will be conducted by the Forestry Experiment Station of MAFF using mainly poplars for pulp material.

Algae Centered on Laver

Currently, biochemical studies of "edible fungi" are being done at the cellular level. By applying this technique, an attempt will be made to prepare protoplasts for cell fusions of Cortinellus, Pleurotus, Coprinus, Armillaria, Collybia, etc, to produce edible fungi with high productivity or with new flavors. The research will be conducted by dividing the work between the Forestry Experiment Station and the National Food Research Institute of MAFF.

Among the "algae," the production of individuals from protoplasts has already been successfully accomplished in some edible algae. In this research, a technique for producing new lines by cell fusion will be developed centered on Porphyra. The research will be conducted mainly by the Tokai Regional Fisheries Research Laboratory of MAFF. Research on the algae of cold regions such as Laminaria will be commissioned to the Faculty of Sciences, Hokkaido University; and research and development of an enzyme suitable for preparing protoplasts, to the Faculty of Fisheries of Kagoshima University.

Overall research will be conducted on these projects at the Institute for Plant Virus Research, where a protoplast was prepared for the first time in the world.

The goals to be achieved through these research and development projects are to obtain hybrids between closely related species as new breeding material for major crop plants, vegetables, flowers, fruits, edible fungi, trees, etc, and to grow from these materials crop plant varieties having new characteristics in the future.

Specific Antibodies and Vaccines

In the "development of cell line functional modification techniques by cell fusion," research will be carried out in four categories: 1) development of monoclonal antibody production techniques, 2) technical development for production of highly virus-sensitive cell lines, 3) development of a genetic analysis technique by cell fusion, and 4) development of a technique to improve cell lines for pearl formation.

The "development of monoclonal antibody production techniques" involves establishment of a technique to prepare monoclonal antibodies against swine influenza virus with extensive mutations and those for mammalian type Mycobacterium tuberculosis, avian type M. tuberculosis, and M. paratuberculosis which overlap serologically and are difficult to diagnose.

Test Tube Vaccines

It is due to lymphocytes that antibodies are produced in animals infected by virus or bacteria. But lymphocytes cannot be cultured. However, it has been proven by research thus far that it is possible to produce an antibody-producing line that can be cultured by cell fusion of cultured cells originating from a myeloma and lymphocytes.

When cultured cells having the properties of lymphocytes are produced using this technique, it becomes possible to make vaccines in a test tube.

Individual lymphocytes separately produce many kinds of antibodies, A, B, C, D and E, which make up an antiserum as a whole. One antibody-producing cell produces only one kind of antibody. Therefore, by isolating individual cultivatable antibody-producing cells obtained by cell fusion and separately multiplying them, each cell line will produce one kind of antibody (monoclonal antibody), and each monoclonal antibody can be produced in a large quantity.

When, among those monoclonal antibodies produced in this manner, one with a high specificity to an antigen is selected, a highly precise diagnostic antibody or prophylactic antibody can be obtained. Furthermore, the antigen can be refined to a higher purity by using the principle of absorption and dis-association.

In other words, the antibody-producing cells formed by cell fusion and having the properties of lymphocytes produce various kinds of antibodies, A, B, C, D and E. If, for example, only antibody C that specifically reacts to influenza is individually taken out among those antibodies under a microscope and collected, an antiserum having a very high precision to react only to influenza can be produced, which enables the development of a vaccine for swine influenza, etc.

It is also applicable to tubercle bacilli. Tubercle bacilli include mammalian type Mycobacterium tuberculosis, avian type M. tuberculos, and M. paratuberculosis, and they could not be distinguished with the conventional diagnostic antisera. However, when a monoclonal antibody is used, they can all be distinguished. Thus, in the case of avian tubercle bacillus, caution is indicated against birds, and the increased diagnostic precision will lead to preventive measures.

In these studies, the goal is to obtain some prospect for practical application in a 5-year plan beginning in FY-82.

The research will be conducted by the National Institute of Animal Health of MAFF.

Virus Replication Mechanism Pursued

In the project "technical development for production of highly virus-sensitive cell lines," attempts will be made to produce cell lines for culturing the bovine leukemia virus, swine enterovirus, and rice dwarf disease virus by fusion and to develop a technique to replicate virus in large quantities with these tissue culture cells to be used for vaccine production and analysis of the virus replication mechanism. Or, cell lines for culturing cytoplasmic nuclear polyhedral disease virus of insects, ellipsoids of spleen disease virus and poxvirus will be produced by fusion, and a foundation for using the natural enemy, virus, will be built.

In order to culture virus in pure form, it is necessary to use tissue culture cells. Depending on the animal tissue of origin, some animal cells can be cultured whereas others cannot. On the other hand, the degree of viral replication (sensitivity) varies greatly by the type of tissue culture cells (tissue type of origin).

Consequently, it is possible to obtain a cell line that is highly sensitive to virus and readily cultivatable by fusing a readily cultivatable cell line with a tissue cell having a high sensitivity to virus. As a result, viral replication in tissue culture cells becomes easy, and pure culture becomes possible in large quantities.

The research will be shared by the National Institute of Agrigultural Sciences, the Fruit Research Station, the National Institute of Animal Health, the Institute for Plant Virus Research, and the Forestry Experiment Station of MAFF.

Uniform Good-Quality Pearls a Goal

In the project "development of a technique to improve cell lines for pearl formation," the plan is to improve the culture line of pearl-forming tissue (mantle tissue) and at the same time to develop a technique to form a single cell by using enzymes, to produce by cell fusion a strain that has good quality and is readily cultivatable, and to develop a technique to have the cells from the tissue again. By using this tissue, it would become possible to obtain uniform pearls with good quality luster and color.

Pearls are made by inserting a core into a pearl oyster. If the color of the pearl oyster is yellow, a yellow, poor-quality pearl is produced. Therefore, in order to have the yellow pearl oyster produce a good-quality pearl, a piece of mantle tissue of a lustrous, good-quality pearl is now being inserted into the pearl oyster along with the core, and lustrous, good-quality pearls are being obtained.

As explained, qualities such as luster, color, etc of the pearls formed vary with the individual pearl oyster. However, when the core is enclosed in pearl forming tissue and inserted into the oyster, that pearl forming tissue forms a good-quality pearl. Therefore, an attempt will be made to develop a pearl-forming cell line by cell fusion that produces even better quality pearls.

The research will be conducted by the Cultured Pearl Research Institute of MAFF.

The goals to be achieved through these research and development projects are to develop new cell lines that enable mass production of antibodies with strong specificity, mass production of high purity vaccines, and the production of good quality pearls.

Nuclear Transplantation

Mass production of milk cow clones

The "development of animal cloning and breeding techniques by nuclear transplantation" includes: 1) development of a cloning technique for superior livestock lines, and 2) development of a breeding technique for oviparous animals by nuclear transplantation.

The "development of a cloning technique for superior livestock lines" will be for producing animal clones.

For the artificial pregnancy of livestock, research has been advanced in the past concerning the techniques for collecting, preserving, and transplanting a zygote into the uterus. In particular, artificial pregnancy using cultured zygotes is now undergoing application trials. In this research, attempts will be made to develop a technique to acquire ova in large quantities and to establish a technique to generate an individual from an isolated cell of an early embryo, as well as to advance research on external fertilization and parthenogenesis techniques and to develop a nuclear transplantation technique for zygotes and parthenogenetic ova to produce animal clones.

By doing so, the preservation and mass cloning of superior livestock become possible.

For example, in order to produce clones of the Holstein milk cow, a zygote is removed from the uterus of any cow, the nucleus of the zygote is discarded and replaced with the nucleus from a somatic cell of a Holstein, and the zygote is returned to the uterus to produce clones. Thus, by propagating copies of cows that are especially productive among the Holsteins, productivity can be drastically upgraded and superior lines can be preserved.

The research is conducted by the National Institute of Animal Health.

In Russia, an experiment is being conducted by using this method to produce a mammoth by inserting the nucleus of a mammoth into the ova of an Indian elepahnt. When a mammoth is discovered in the ice, the nucleus of the somatic cell is removed and inserted into the ova of an Indian elephant. In this case, successful results cannot be obtained unless the mammoth cells are young, and it is conjectured that they are probably using somatic cells of a fetal mammoth.

They failed in their first attempt; however, there is the possibility for the birth of a mammoth clone if the genes in the nucleus are viable even if the cell is dead.

Applied to Unmatable Species

The "development of a breeding technique for oviparous animals by nuclear transplantation" is an R&D project to produce new species by nuclear transplantation of species that cannot be mated.

Since animal cells are differentiated into various organs and tissues, it is impossible to produce an individual from these cells. However, by removing the chorions of fish and insects to extract their nuclei and by transplanting nuclei from other cells, individuals can be obtained from the transplanted nuclei.

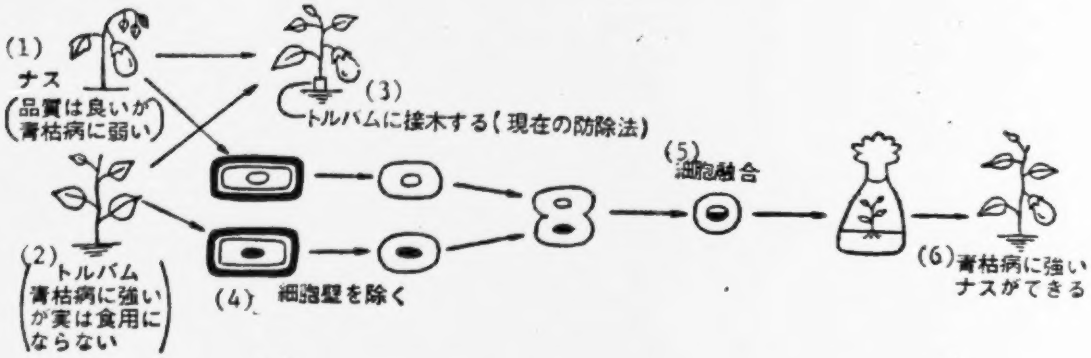
In this research project, ova of loach, rainbow trout, silkworm, etc, will be used to develop a nuclear transplantation technique for ova with a goal of breeding fishes and insects. Furthermore, an attempt will be made to develop a technique to generate an individual by producing hybrid cells with different nucleus and cytoplasm by means of nuclear transplantation in tissue culture cells, and by transplanting the nucleus of hybrid cells obtained by cell fusion.

When this technique is developed, it will be possible to introduce characteristics from a species that could not be mated. For example, it is conceivable to provide thermophilic or homing characteristics to other fish by using the ova of rainbow trout.

This research will be shared by the Sericultural Experiment Station and the Cultured Pearl Institute of MAFF, and in part commissioned to the Group of Biological Sciences, Tsukuba University.

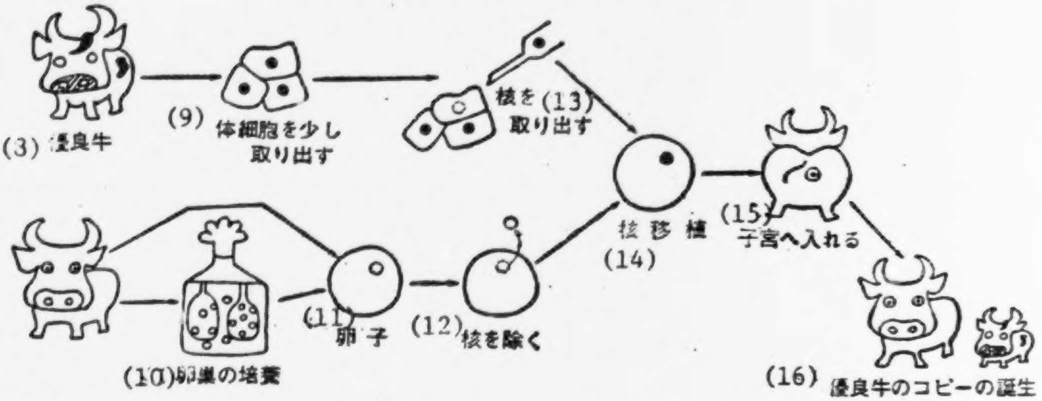
The goals to be achieved through these research and development projects are: 1) to enable cloning and mass production of superior lines by exchanging the nuclei of livestock ova and other cellular nuclei, whereby the breeding time is greatly shortened; and 2) to develop a technique to produce new varieties and organisms by exchanging the nuclei of fishes or insects' ova and fused cells.

Breeding of Crop Plants by Cell Fusion (Process for producing eggplants resistant to bacterial wilt disease)


(1)
ナス
（品質は良いが
青枯病に弱い）
(3)
トルバムに接木する（現在の防除法）
(2)
トルバム
（青枯病に強い
が実は食用に
ならない）
(4)
細胞壁を除く
(5)
細胞融合
(6)
青枯病に強い
ナスができる

(7)

核移植による優良牛コピーができるまで


(3) 優良牛
(9)
体細胞を少し
取り出す
核を (13)
取り出す
核 移 植
(14)
(15)
子宮へ入れる
(10) 卵巣の培養
(11)
卵 子
(12) 核を除く
(16) 優良牛のコピーの誕生

Key:

(1) Eggplant (good quality, but susceptible to bacterial wilt disease)
(2) Tolubum [phonetic]-resistant to bacterial wilt disease, but the fruit is not edible
(3) graft onto tolubum [phonetic] (currently used method of prevention)
(4) remove cell wall
(5) cell fusion
(6) eggplant resistant to wilt disease is produced
(7) process for producing copies of superior cows by nuclear transplantation
(8) superior cow
(9) a few somatic cells are taken out
(10) ovary culture
(11) ova
(12) remove nucleus
(13) take out nucleus
(14) nuclear transplantation
(15) insert into the uterus
(16) birth of a superior cow clone

7722
CSO: 4106/85

BRIEFS

ROCKET DEVELOPMENT--Tokyo, 3 Jun (KYODO)--The Science and Technology Agency and the National Space Development Agency will jointly develop a large-sized rocket capable of launching 1-ton geostationary satellites by around 1990, sources at the agencies said Thursday. The plan for the rocket's development, including choice of design, is expected to be finalized early next week, according to the sources. The development agency is now working on another rocket known as the "H1A," capable of launching a 550-kilogram geostationary satellite. The first H1A is scheduled to be launched in 1987. However, the Nippon Telegraph and Telephone Public Corporation earlier this year made public its plan to launch a 1-ton geostationary satellite around 1988 or 1989 and a 4-ton geostationary satellite in the period 1985-1994, both with the use of the U.S. space shuttle. In response to the corporation's plan, the two agencies decided to develop the large-sized rocket to protect their position in space development, the sources said. [Text] [OW031203 Tokyo KYODO in English 1130 GMT 3 Jun 82]

CSO: 4120/291

END

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MILITARY

PANEL DISCUSSION ON DEFENSE SPENDING

OW191408 Tokyo NHK TELEVISION NETWORK in Japanese 0000 GMT 18 Jul 82

[Panel discussion entitled "How Should Defense Spending Be?" moderated by NHK commentator Kazuo Okamura; with Asao Mihara, chairman of the LDP Defense Affairs Research Council; JSP Vice Chairman Masashi Ishibashi; Ko Maruyama, military commentator and former defense agency administrative vice minister; and military commentator Haruo Fujii]

[Text] [Okamura] While working on next year's proposed budget ceilings, the government decided to accord special treatment to defense spending, along with several other fields, in next year's budget despite the serious financial situation. At the same time, the LDP's defense-related departments, including the Defense Affairs Research Council, formulated a recommendation at their joint meeting last Wednesday, expressing the view that it cannot be helped if defense spending is increased by over 1 percent in the near future.

The question of how to deal with defense spending is very important in compiling future budgets and defense programs as well as in planning Japan-U.S. relations. In this context, today we are going to present a panel discussion by four experts on the subject of "How Should Defense Spending Be?" To begin with, in dealing with next year's proposed budget ceilings the government has decided to cut most budget items by 5 percent. However, the government has also decided to accord special treatment to defense spending by increasing its ceiling by 7.346 percent. I would like to first hear your views on this decision. What do you think, Mr Mihara of the LDP?

[Mihara] In view of the serious financial situation, as you have joint pointed out, the defense budget cannot be a santuary. Therefore, we are determined to tighten the defense budget as well. We particularly note that the mass media frequently talk about a marked increase in defense spending despite difficult internal situations. This is likely to lead the general populace to believe that defense spending alone is increasing. The people in general feel that welfare and education outlays have been reduced because of some special treatment for defense spending.

Under such circumstances, we--who are dealing with defense affairs--have now been striving to implement the national defense program outline formulated in 1976 in a steady way. When President Reagan and Prime Minister Suzuki met last year, they talked about implementing this national defense program outline on a steady basis and as speedily as possible. In this connection, we have thus far made constant efforts to implement the 1978 midterm defense buildup plan. Taking those efforts into consideration, we hope that people will understand our position of assigning a separate framework to the defense budget although we do not consider it to be a sanctuary. Of course, this special treatment will cause some problems among government ministries and agencies, but we hope that special consideration will be given to defense spending.

Thus, as you have mentioned, our party decided last week to increase defense spending by 7.3 percent, or 190 billion yen. In this connection, I have received seven telephone calls regarding my position on defense spending. The callers all expressed the fear that the boost in defense spending might lead to war or cutbacks in welfare expenditures for aged people. I told them that such things will not happen.

In view of this deep popular concern and the current difficult financial situation, I perceive these special ceilings for defense spending with a strict sense of responsibility. I believe that we should use moderation in pushing ahead with Japan's defense buildup. Accordingly, I also believe that we should maintain a strict attitude in dealing with upcoming defense budget requests based on these ceilings.

[Okamura] Mr Ishibashi of the JSP, what do you think about the special treatment decision on defense spending?

[Ishibashi] This is not the first time it has occurred. The trend toward special treatment on the defense budget has become increasingly conspicuous in the past 3 years or so, I believe. Mr Mihara sounds as though he is trying to say that such special treatment is a matter of course under the present circumstances. They are trying to get the people to become gradually accustomed to it, and I think it is a very dangerous trend. I have been saying that the present situation is reminiscent of the prewar days. It is indeed reminiscent of the 1930's. First, there is economic stagnation, which is pushing state finances to the brink of collapse and into massive deficits. Nevertheless, the military budget alone continues to increase. In addition, in terms of political corruption, there is a striking resemblance between the present situation and that of the 1930's.

What did those combined factors lead to in the past? They led to the 1940 war, which ended in the nation's tragic defeat. The first thing that comes to my mind is the fear that we may see history repeated.

Another thing I would like to point out is related to the speech Prime Minister Suzuki made at the recent UN special session on disarmament. It was a great speech indeed. He called for mutual trust to be restored among nations, a curb on the endless arms race and for the realization of disarmament. More importantly, he even suggested that the money thus saved be generously spent to aid the developing countries and underdeveloped nations. Now, the special treatment decision on defense spending came on the heels of that speech. In this situation, we cannot help but feel that the prime minister uttered a transparent lie. While paying lip service to disarmament, he is actually increasing the military budget and promoting the military buildup. This kind of behavior will lead to further erosion of public confidence in the government, I fear.

[Okamura] Mr Maruyama, you once served as director of the defense bureau of the defense agency, then as administrative vice minister of the same agency. What is your view about the special treatment accorded the defense budget estimate for the next fiscal year?

[Maruyama] The whole issue boils down to how the budget should be compiled at a time when the government is in such fiscal trouble as it is now. In the past days of high economic growth, no special consideration was given to the defense budget, which stayed at 0.8 percent of the GNP. However, our country, in conducting state affairs, has made clear its position as a member of the West. In this situation, it becomes necessary for the nation to show to the world that it is making efforts for its own security--efforts commensurate with its position--and to win international recognition of this posture.

The United States, our ally, and those West European countries which are also members of the western alliance have heretofore been highly critical of our defense [word indistinct], to say the least. In order to survive as a member of the international community, we are required to make efforts commensurate with our resources. What kind of a budget should we come up with to show that we can do at this time of fiscal difficulty? This is one of the problems.

Another problem stems from the fact that the Japanese defense budget for a given fiscal year has so many items incorporated in it that appropriations for many of them are spread over the budgets for the following year or years. This fact, which results from various strict limitations imposed on the budget compilation work, represents a major characteristic of our defense budget. Consequently, the budget approved by the Diet will contain contract appropriations that will be carried over into future budgets. The government eventually is required to pay for the contracts. As much as 6 percent of the projected increase in the defense budget is for such payments. Besides, the inevitable rise in personnel expenditure takes up 1.3 percent of the projected increase. Combined, these two factors alone represent 7.3 percent of the projected increase. The proposed budget, therefore, is a skeleton one and includes almost no new contracts or new projects. This problem reflects the characteristics of our defense budget.

[Okamura] Mr Fujii, what is your view of this issue of special treatment for the defense budget?

[Fujii] The present situation, I think, indicates the future trend of budgetary increases. In terms of the rate of growth, the defense budget 2 years ago beat the education budget, then the welfare budget last year. In the budget for the current fiscal year, the margin of the defense budget over other budgets became even larger--considerably larger. It is going to be even larger in the future than now, with a 5-percent cutback projected for next year on all budgets except defense. Furthermore, as Mr Maruyama has just pointed out, payment has to be made from the national treasury for things that were purchased on credit.

All this indicates that the government is headed in a wrong direction. On the question of welfare, for example, the constitution clearly states in Article 25, section 2 that the state shall use its endeavors for the promotion and extension of social welfare and security, and of public health. On the other hand, the constitution has no provision--no provision at all--concerning the nation's defense spending. In reality, however, the item that has no place in the constitution is receiving a preferential treatment while such things as welfare are subjected to cutbacks despite provisions in the constitution. This means that what the government is doing is a departure from the constitution. Is it allowed to do this? The government and the Diet are required to abide by the constitition; in reality, however, the government is doing things against the constitution. This is a problem.

In short, I cannot but say that the three major principles upheld by this country since World War II--namely, the livelihood and welfare of the people, democracy and basic civil rights, and peace--are now faced with a grave problem.

[Okamura] We have just heard the basic views of the four guests. Comparison is often made between the defense and welfare budgets as we have just seen it in Mr Fujii's opinion. Is the growth rate of the defense budget really exceptionally high? To find an answer, let us look at the budget for the current fiscal year. It indeed shows a 7.754 percent increase in defense expenditures against a 2.8-percent gain in social security expenditures. Meanwhile, in terms of actual amounts, the budget earmarks 9 trillion 84.8 billion yen for social security, and 2 trillion 586.1 billion yen for defense. This means that the social security budget is 3.5 times as large as the defense budget.

Now, Mr Mihara, in connection with the exceptionally high growth rate of the defense budget, what balance do you think there should be between defense and social security expenditures when the defense budget is compiled? Or, is defense spending a question that totally transcends such considerations?

[Mihara] This is quite a controversial point. Mr Fujii has even extended his views of the constitution regarding this subject. Such a question indeed involves endless arguments. Answering your question, Mr Okamura, we believe that it is a questionable practice to draw comparisons between defense and social security expenditures. Though high in growth rate, defense spending is less than one-third of the social security budget in terms of actual amounts. Therefore, it is unreasonable to claim that the defense budget is exceptionally high. Apart from such numerical arguments, I would like to point out that maintenance of national peace is the most important element of welfare and leads to educational promotion.

In this context, I hope that people will understand that the development of the self-defense forces and the compilation of the defense budget have a connection with the question of peace, social security and education. I believe that the current peace and order in our nation stems largely from our self-defense capabilities and a system which allows no one to make little of us. In this sense, we require [words indistinct] weapons, more or less. Nevertheless, it is our hope that we will be able to keep our defense outlays at the lowest possible levels. However, we are urged to tackle the issue of developing self-defense capabilities in view of our international relations and the stern world situation. We should consolidate our defense system so that we can promote welfare and education in peace. This is how we would like to handle the issue of developing our self-defense capabilities.

In addition, I would like to have the people understand that we are maintaining self-defense capabilities to promote peace. It is totally wrong to think that an increase in self-defense capabilities and defense spending leads to war--a notion that has already been expressed in this program. I would like to have the people understand this. I think that we should strive to promote this understanding in the future.

[Okamura] Mr Ishibashi, I know well of your personal and party views on the constitution and of your support for the demilitarization and neutrality positions. What is your actual view about defense and social welfare expenditures?

[Ishibashi] As has been pointed out by Mr Fujii, the constitution stipulates that all people shall have the right to maintain the minimum standards of wholesome and cultured living. I think that the government had this stipulation in mind at least until a few years ago. The social welfare budget had been treated rather well, in terms of absolute amounts, until then. However, this budgetary stress on social welfare was reversed in 1981 and military spending began to receive special treatment.

As I pointed out then, a very subtle trick was played in the compilation of the fiscal 1981 budget. The rate of increase in social welfare outlays was set at 7.6 percent and that in defense expenditures at 7.61 percent, thereby shifting the budgetary stress from welfare to defense for the first time. When we pointed out this reversal, the government and the ruling party evasively said that the gap is only 0.01 percent. This was indeed a cunning trick. This gap became surprisingly larger in the fiscal 1982 budget with military spending rising by 7.75 percent and social security expenditure increasing by 2.8 percent. Perhaps this gap will become even greater in the fiscal 1983 budget. It is this trend that I would like to call into question. Military expenditures will continue to rise at a greater rate than budgets for social security and education. It is important for us to understand this shift in budgetary emphasis which has already begun.

In view of the current aggravation of state finances, it is impossible to accord special treatment to military spending without sacrificing some other areas. The areas that are actually sacrificed are those of which people entertain the greatest expectations. It is this trend that I would like to call into question. The government has decided to increase next year's ceilings for defense spending by 7.35 percent, while raising no ceilings for other budgetary items. I believe that the 7.35 figures are not final and that defense ceilings will be further increased as we saw last year. In order to meet requests from the United States and hawkish elements inside the LDP, the rate of increase will further be raised. At this stage of the deliberations on the proposed budgetary ceilings, the rate of increase has been set rather reservedly at a lower level. This is a really artful trick. I believe it is a terrible trick.

[Okamura] Mr Maruyama, as you have just heard, Mr Ishibashi says that the government and the LDP shifted their budgetary stress from social security to defense expenditures in 1981. What is your view of the relations between defense and social security outlays?

[Maruyama] As Mr Ishibashi has said, the rate of increase in defense spending topped that of social security expenditure in the fiscal 1981 budget. Before discussing this greater boost in the rate of increase in defense spending, I would like to make a general review of how the defense budget has been treated thus far. In 1952, defense spending occupied 20.76 percent of the general account. Of course, the defense budget then included different items such as the defense share outlay, compared with the present budget. Nevertheless, this rate of defense spending in comparison to the total amount of the general account continued to decrease year after year from this 20.76 percent in 1952. In other words, the rates of increase in defense spending were continuously lower than those in the amount of the general account. This trend continued under the financial policies of the government and the ruling party. As you might know, the rate of defense spending compared to the amount of the general account now stands at slightly above 5 percent. Concerning defense spending in fiscal 1981, which Mr Ishibashi just mentioned, I would like to point out that its rate in comparison to the amount of the general account fell to 5.13 percent, the lowest since the end of World War II. This rate rose slightly in fiscal 1982 to 5.21 percent. Thus, as I have said, defense spending has increasingly been curbed under the basic policy of setting the rate of increase in defense spending at a lower level than one in the amount of the general account. I believe that this trend should be corrected some time. I know that there are people who are opposed to this stand, asserting that this permanent downward trend should never be corrected.

However, what we are dealing with is a vitally important issue that affects the nation's security. Any attempt to impose a fixed ceiling, such as 1 percent of GNP or the like, on such an important matter would look rather awkward internationally. More importantly the nation must consider and decide what kind of equipment is required now. In my view, the substance of the budget is more important than the size of it.

[Okamura] Mr Fujii, you earlier referred to article 25 of the constitution. However, as Mr Maruyama has just said, it can be said that generally, the growth rate of the general account or social security expenditure in the past was larger than that of the defense budget--I mean except for the past year or two. Would you like to comment again on defense spending in comparison with the social security budget?

[Fujii] Mr Mihara mentioned peace. Basically, no one can deny the importance of peace. But, how has peace been preserved? It is a fact that we have so far managed to maintain peace. Has it been the nation's defense capabilities that has maintained that peace? This is the point where different views come in. I personally believe that it has not been our defense capabilities that have maintained peace for us. This should be clear to all the Japanese people who experienced the tragedy 36 years ago. The lesson was that peace is not defended by defense capabilities or by military forces. Then, what defends peace? One thing clear is that it is by no means a military force. Accordingly, it is wrong to try to preserve peace through a military buildup. Such a buildup could lead to war. Then, what should be done for peace? The answer is the United Nations and our constitution. We should work for peace through the United Nations and through a peace diplomacy conducted in the spirit of the constitution. Furthermore, citizens should join in antiwar movements in grassroots levels. Peace cannot be preserved without these activities. I, therefore, believe that the concept of defending peace through an armed force is something like putting the cart before the horse. We must correctly grasp this point. What I am driving at is that welfare and peace are one thing and military buildup has its place exactly in the opposite direction.

[Okamura] Mr Mihara, according to Mr Maruyama, the substance of the defense budget is more important than the size of it. Aside from domestic arguments in this country, there have been strong and continued U.S. requests for Japan to build up its defense. For example, a resolution passed by the Senate calls for defense spending in excess of 1 percent of the GNP. In your view, is the United States asking for spending of a new size--say 1 percent of the GNP--or is it seeking some specific buildup?

[Mihara] Concerning our defense buildup efforts, other guests here have expressed their concern that the nation might again end up as a military power, or that it is pursuing a line of military expansion. Their concern is unfounded. The fact is the peacetime level of the nation's defense capabilities was set 6 years ago, which was then approved by the Diet. We have been striving to reach that level on a year-by-year basis. What we are doing is in keeping with that peacetime-level policy. In implementing that policy, we decided to put a brake on defense spending by keeping it below 1 percent of the GNP. I feel that we should continue to abide by that policy decision. Nevertheless, it is a related factor. One may argue that defense spending should be more than the equivalent of 1 percent of the GNP, but more importantly, as Mr Maruyama pointed out, we must implement the 1976 defense buildup outline. Six years have passed under this program, and we now have 4 or 5 years to reach the level set forth in it. We have never thought of Japan becoming a military power. In formulating the yearly defense budget, we are still striving to respect the 1 percent of GNP limit. But our efforts are inevitably affected by prices and other economic factors. The GNP itself is affected by these factors. Our future efforts will be guided by the same yardstick--the 1 percent of GNP--but fellow citizens are asked to understand that it is a policy decision that was adopted in the past. We are exercising moderation in implementing the defense buildup program. All the charges that we are trying to turn Japan into a military power, that we are pursuing a line of military expansion or that we are even preparing for war, are totally unfounded. I would be happy if you would keep this in mind when you view the relationship between the defense buildup issue and the 1 percent of GNP question.

[Okamura] The Carter administration put strong pressure on Japan to build up its defense. The Reagan administration is doing the same. In this connection, Mr Ishibashi, what do you think the United States is seeking?

[Ishibashi] What the United States sought was clearly indicated during the Suzuki-Reagan talks last year, and subsequently in the joint communique issued after the talks. The joint communique defined for the first time Japanese-U.S. relations as an alliance. The United States demanded that Japan recognize its status as a member of the West, and that its defense efforts not be limited to the defense of Japan but be made on a broader scale and commensurate with its status. Mr Suzuki accepted the demand, to cause the whole problem. At a budget committee session of the Diet, we asked the prime minister when Japan had become a 51st state of America. A bill was introduced in the U.S. Congress demanding an increase in Japan's defense spending to an equivalent of 2 percent of the GNP. Another resolution introduced in the same congress demanded a spending in excess of 1 percent of the GNP. All this shows that the United States regards Japan literally as its 51st state. It is more than interference in our domestic affairs. We asked Mr Suzuki if he regarded it as interference. He answered that he did not regard it as interference.

Mr Suzuki's answer indicates that he sees the situation in a different light. The way Mr Suzuki sees it, I believe, is that inasmuch as Japan had made a commitment, Japan is now under pressure to fulfill that commitment. The way we see it is that the United States is engaged in outright interference in our domestic affairs. The kind of resolution introduced in the U.S. Congress shows that the United States regards Japan as nothing more than a satellite country. Frankly speaking, it is preposterous indeed that people argue about the nation's security without understanding this fact.

[Mihara] Let me say a word about Mr Ishibashi's comment to the effect that regarding the defense buildup with the taxpayer's money, the United States is treating Japan as a satellite country. I think that the underlying factor in Japanese-U.S. relations is the two nations' perception of the world situation. I must add here that Messrs Reagan and Suzuki shared the same view about the present world situation and agreed to strive jointly for world peace and prosperity. The world alliance should be interpreted in this sense.

Another thing I would like to point out is that the nation's defense buildup efforts are being made, from the beginning of the end, under the limitations imposed by the constitution. In terms of its proportional percentage, our defense budget is so meager that we cannot compare it with those of other countries. We are trying to meet the nation's defense requirements with a small budget. Incidently, the budget is naturally not intended for any overseas invasion, absolutely not. The budget is absolutely for the defense of Japan. In the event of an invasion of this country by an outside force, we will try to repel it with the minimum self-defense forces we have; in case we fail to do so, we must rely on the United States for assistance as provided for in the security treaty. The United States has such a role to play in our joint operations for the defense of Japan, and for this reason, I think that U.S. views about defenses of this country should be respected.

Nevertheless, as Prime Minister Suzuki said, it is our position that while listening to any U.S. request with an open mind, we maintain an independent posture as regards the nation's defense buildup business. The satellite-country charge is absolutely unfounded.

[Ishibashi] It is a fact that an outrageous bill demanding Japan's defense spending to be increased to the equivalent of 2 percent of the GNP was introduced into the U.S. Congress. About this fact, I would like to hear some clear-cut comment worthy of a Japanese. Furthermore, there is the resolution introduced in the same congress demanding that Japan should spend more than 1 percent of the GNP for defense. These things involving Japan were introduced in the parliament of another country. Could the government feel nothing about this fact? Does it yet find itself qualified to talk about the nation's security? Those are my questions.

Mr Suzuki says that he does not see the U.S. demand as interference in our domestic affairs. The reason is that he made a commitment. But the substance of the commitment he made is a total violation of the Japanese constitution. The government has been saying that what it seeks is to build capabilities for purely self-defense purposes, and that this stand is constitutional. Now, both President Reagan's demand and Mr Suzuki's commitment have gone beyond the boundary of this alleged constitutionality. They agreed that Japan can defend a 1,000-mile long sealane, or that Japan has the obligation to do so. It is simply impossible for anyone to find any clause in the Japanese constitution to justify that kind of an agreement. Such being the situation, we can say definitely that what the government is doing now is not for mere self-defense. It has become clear that Japan will be dragged into a war launched by the United States. This is the point I would like to make.

[Okamura] Mr Maruyama, regarding the Levin resolution, calling for Japanese defense spending to exceed 1 percent of the GNP, Secretary of State-designate Shultz recently took a stand against it. What do you think is the background of this type of resolution? What is it that the United States is expecting of Japan? Do you see the Japan-U.S. joint communique of 8 May last year of Prime Minister Suzuki's speech during his U.S. visit as factors prompting such a resolution?

[Maruyama] I often discuss the issues of defense and trade imbalance with Americans. I personally view the two issues as being totally separate. I believe that they should be separate issues, but from the American point of view, they are not necessarily so. The Americans would say that they view them both in the same economic light. That is what they say, but my view is that the two issues basically belong to different orders.

I completely agree with Mr Ishibashi concerning U.S. congressional moves about Japan's defense spending or about a so-called defense tax on Japan. It is unjustifiable indeed for the parliament of one country to attempt to pass legislation concerning the security of another country.

For several years now, for the last 2 or 3 years rather, prevailing public opinion has had it that Japan should increase its defense spending because the United States says so. My opinion is that Japan's defense should be planned by the Japanese themselves, and that, since the nation's defense is their own business, the Japanese themselves should be more responsible for it. Japan indeed maintains an alliance with the United States under the provisions of the security treaty. It is defended by collective security arrangements with the United States. These arrangements represent one of the major pillars of the nation's security policy. The policy calls for a gradual buildup of the nation's own defense capabilities and, at the same time, maintenance of collective security arrangements with the United States. I feel that, under these arrangements, Japan is required to make its share of the joint defense efforts with the United States, its ally. Nevertheless, I insist that we must not forget that Japan's defense is the business of the Japanese people themselves. In my memory, the prime minister has also made remarks to that effect more than once before the Diet. I think that the controversial defense spending versus GNP issue, like other defense issues, should be considered from this point of view.

[Okamura] Mr Fujii, what is your view of the background of the U.S. demand for Japan's defense buildup?

[Fujii] In its defense report 4 years ago, the United States called for a gradual and prudent--not abrupt--adjustment of responsibilities for collective security. The United States has since been moving along this line. In this connection, I fear that Japan has increasingly been getting stuck in this U.S. effort, playing into the hands of the United States. It seems that the United States has been carrying out very crafty psychological operations to manipulate the Japanese people. It will bring serious consequences if they really get caught in such U.S. maneuvers. In short, I would like to say that Japan has its own stand and position and should not think about the security of the United States. In other words, Japan should think about its own national security from its own standpoint. For example, what is called the 1,000 nautical mile defense is impossible, meaningless if possible, and even risky. This is clear from our past World War II experience. It is obvious that Japan should not follow such a defense formula. Nevertheless, the prime minister made a promise regarding the formula while visiting the United States. As a result of this promise, Japan's defense range commitment doubled. Further, this has given rise to the need to double its defense capabilities.

In this context, the idea that the two countries share the same view, as said earlier in this program, is basically wrong. I believe that we should clearly mention the difference of views between the two countries.

[Okamura] Let us turn to another subject. Mr Mihara, at national defense council and cabinet meetings on 5 November 1976, the government decided to make it a longstanding principle not to allow defense spending to exceed 1 percent of the GNP. A recommendation was adopted at a joint meeting of the LDP's security affairs research council, defense affairs department, and special committee on military bases on Wednesday last week. In the recommendation, it was said that it cannot be helped if defense spending exceeds 1 percent of the GNP during the new 1983-1987 midterm defense buildup plan period. When do you think defense spending will actually top the 1 percent level?

[Mihara] We still make it a rule to stick to the policy established in 1976. The question, however, is soaring prices and the difficult growth of the GNP as has already been mentioned. In addition, the new midterm defense buildup plan is going to be implemented shortly. In the process of planning under such circumstances, we cannot rule out the possibility that defense spending might exceed 1 percent of the GNP although we are intent on preventing this from happening. When this becomes a possibility, however, I think that we should have full discussions at the national defense council and the Diet to listen to the voice of the people. The possibility also should be discussed at various party organizations. We are not saying that we will increase defense spending above the 1 percent level as soon as we feel the need to do so. We have to maintain proper defense capabilities somehow. When we face the need to increase defense spending by more than 1 percent of the GNP due to various affecting factors, we will act prudently and seek popular understanding. We will refer the issue to the national defense council for discussions based on the principle of civilian control over the military. This possible increase in defense spending by more than 1 percent of the GNP was mentioned in the above-mentioned recommendation on the basis of surveys of 5-year and longer-term plans. I believe that when such an increase in defense spending becomes a necessity, we cannot but take such measures in order to cope with the new situation. In such a case, however, we should always curb excessive increases.

[Okamura] Mr Ishibashi, I believe that you are not approving even the current increase of 0.93 percent of the GNP. Nevertheless, do you believe that the principle of 1 percent of the GNP will continue to curb excessive increases in military spending? At its joint session, the LDP expressed in its recommendation the view that it cannot be helped if defense spending exceeds 1 percent of the GNP during the new midterm defense buildup plan for the 1983-1987 period. What do you think?

[Ishibashi] It has not curbed, nor do I believe it will curb [excessive increases in military expenditures]. At an interpolation session of the Diet in October last year, Mr Mihara said that the 1 percent principle would be observed. I remember that disbelieving his remarks, I then asked if he meant to say that the principle will be observed at least under Suzuki's government. However, Mr Suzuki himself has now begun saying it cannot be observed. Citing the growth rate of 5.1 percent envisaged in the new 7-year economic and social plan, he says that if this growth rate continues, defense spending will be held under 1 percent of the GNP for some time, but that if this growth rate of 5.1 percent is not attained, defense spending could exceed the 1 percent level. It is now a matter of common sense that the 5.1 percent growth rate is impossible. Japan attained a growth rate of 2.7 percent last year. Our common sense tells us positively that the growth rate this year will be somewhere between 2 and 3 percent. In this context, it is clear that in his above remarks Mr Suzuki himself has admitted that it is impossible to hold defense spending under 1 percent of the GNP. This means that our assertions and concerns regarding this question have always been right. Nevertheless, the government and the ruling party continue to quibble and cheat the people until the very moment the truth is completely revealed to the public. This is a big problem indeed.

In my opinion, military strength is bound to multiply on its own at a rapid pace as long as we agree to its existence. This is an essential feature of military strength. I do not believe it can be curbed at any certain point. Nevertheless, we have to do something about curbing it in order to prevent Japan from becoming a military power. In this context, we have to use the principle of 1 percent of the GNP as a means to restrain the military buildup. We can restrain the acts of the government at least momentarily by recalling it to its pledge that it will not increase defense spending to more than 1 percent of the GNP or that it will not issue deficit any further bonds. In addition, we have the three arms export principles and the three nonnuclear principles. Although we do not believe that the government and the ruling party will observe those principles, they have curbing effects to some extent. Therefore, we continue to urge them to observe these principles.

However, we know that as our reality shows, it is impossible to completely observe these principles under the rule of the LDP government. I believe that actual developments have already begun to show this.

[Okamura] Mr Maruyama, you were a vice minister of the defense agency in November 1976 and I think that, at that time, the then defense agency director General Sakata and Finance Minister Ohira exchanged heated debates as to whether the defense spending should be within or about 1 percent. In so doing, they used the phrase "for the time being." Until what time did they specifically mean by that phrase? Did they mean that it is unavoidable now?

[Maruyama] For the time being? For the time being is for the time being. [laughter] Our perception was that it meant the earliest possible time. Once a decision is made on something at a cabinet meeting, it somehow takes its course all by itself. This is why they are still saying that defense spending should not exceed 1 percent of the GNP. The two cabinet members exchanged those heated debates at that time because it was immediately after the 1973 oil crisis and--as you know--Japan's high economic growth stopped then and there. So, we were on the threshold of a new era. Until then defense spending accounted for about 0.8 percent of the GNP but, since the denominator at the time was large, defense spending, in fact, showed increases. But we are ushering in a very difficult time now. The financial authorities were of the opinion that the defense budget should still not exceed the limit of 1 percent of the GNP. For these reasons the two cabinet members of that time exchanged very heated debates as to whether the 1 percent ceiling could be topped depending on circumstances and whether this possibility should be taken into consideration or not. That is what I remember. In conclusion, I would say that, although the cabinet meeting at issue decided that defense spending should not exceed the 1 percent ceiling, when we find the GNP in a situation like the current one, those who insist that the GNP should be used as a yardstick must change their way of thinking. They say that [defense] spending is a most vital question to the nation. Why should they set such limits when thinking about this important question? I have a hard time understanding this point.

[Okamura] I see. Mr Fujii, what do you think of Mr Maruyama's idea about a so-called 1 percent of the GNP yardstick? Or do you still think that the 1 percent ceiling will serve as a restraint?

[Fujii] Well, at the time when it decided on the outline of the defense program in question, the government wanted to stop the defense buildup around there as far as the quantity was concerned. It wanted to make rapid improvements in quality but to check the buildup in quantity. But now the government wants not only to strengthen defense in terms of quality but also to remove the restraint on quantity. Kubo, former defense agency director general and the present national defense council secretary general, who drafted the basic defense buildup plan which served as the basis for that outline, held the view that it is better to have as little armament as possible and that disarmament is more desirable. But this view cannot be found in the least among the present defense authorities. Thus there has been a marked change. Mr Kubo and other officials were of the opinion that it is better to have as little armament as possible and it is even more desirable to have no armament. In other words, they carried out their duties using the principle of the constitution as their guideline. But, in a total departure from this, the authorities now are trying to remove that restraint permanently. On the basis of the outline of the defense program, the 1978 and the latest 1981 mid-term work estimates were compiled. Since the 1981 work estimate was mapped out in accordance with the outline, some officials now even go so far as to say that the outline of the defense program itself should be changed. Put simply, arms expansion will go on boundlessly. I am afraid that this is the present situation.

[Okamura] I see. Mr Maruyama, Mr Fujii has just talked about the outline and your predecessor, former defense agency administrative vice minister Kubo. To be sure, the present outline of the defense program was adopted while you served as administrative vice minister. But lately, even the United States has been calling for a review of this outline. I will get to this question later on but some quarters within the LDP are also calling for its review. As the official in charge of the preparation of the outline, Mr Maruyama, do you think that the outline of the defense program is all right as it is?

[Maruyama] As far as I am concerned, I think that it should be reviewed.

[Okamura] Ah, is that so?

[Maruyama] You just heard Mr Kubo's name mentioned, but it is not necessarily a question involving Mr Kubo alone. What served as a draft here was the regular 1971 Diet session, I believe. Since it was before I assumed the defense agency post and because I did not experience it personally, I only learned about it by hearsay. The opposition had a demand at that time. It asked the government to show a ceiling, or limit, to Japan's defense buildup, assuming that the Far East situation--mainly centering around U.S.-Soviet relations and Sino-Soviet relations--would not change drastically. It asked that the government set a limit to Japan's peacetime defense capabilities assuming that the situation surrounding Japan would change peacefully. So the prime minister--I heard it was Prime Minister Tanaka--issued instructions. On the basis of his instructions, the defense agency worked and came up with a quantitative limit. As a matter of fact, there were many complications and no report on it has been made to the Diet after all. Anyway, this became the groundwork. It is written in an attached table that the ground forces, for example, would be 180,000 men in 13 divisions. This is a numerical limit set during that time.

As I said just now, these limits were set on the assumption that the international situation surrounding Japan would not change drastically. However, since then quite severe international developments have taken place even in areas surrounding Japan. For instance, the Sino-Vietnamese conflict was a question which had not been even anticipated at that time. This conflict and other developments occurred. Has the government reviewed this outline of the defense program to cope with the changed situation? No, not even once. I am not saying that the outline should be revised. But I think that politicians should meet and review it when there has been a change in the international situation, which is a precondition for the outline, and especially when a question arises which might seriously affect Japan. To my regret, there has been no such review made to date.

[Okamura] Mr Mihara, at a joint meeting of the LDP's security-related councils held last Wednesday, it was decided that a review of the outline would be commenced at once for working out the 1981 mid-term work estimate, which covers up to 1987, was it not?

[Mihara] Yes.

[Okamura] Does the word "review" mean literally a review or does it mean a revision, after all?

[Mihara] Since our LDP is broad in composition, some of its members call for a review of the outline, some others say that a view is not necessary, and still others call for a revision. Mr Maruyama has just spoken about a limit on defense potentials and I want to add one thing. Prime Minister Suzuki has established a so-called ministerial council on comprehensive security affairs. In thinking about Japan's defense, that sort of buildup in self-defensive potentials is, of course, necessary. But I also think that we should at the same time think about the benefit of extending economic developmental assistance for the peace, security and prosperity of the world as a whole. Of late, a peace movement has been launched and an antinuclear movement for disarmament carried out. At this juncture, I think it is a high time for us to form a new conception based on the position that Japan is a special country--we strongly believe that Japan is an ideal country.

The gentlemen here have been talking about various things including an arms race and a war. But I think that it is time now to form a new conception about the defense of Japan. I think that politically Japan in the 1980's needs to judge the world situation on a global basis--without being concerned with only itself--and think about how to cooperate for world peace and how to deal with those various potentially dangerous zones in the world. In this sense, we need to think about how Japan's peace strategy should be, what Japan should do under such a severe situation, what degree of self-defensive potential Japan should possess, and what role Japan should play. Proceeding from this kind of conception, I think that it is time now to review the outline of the defense program which was worked out in 1976. This work may take 1 year, 2 years or even 3 years. Anyway, I think that we must commence the work.

[Okamura] Mr Ishibashi, it is written in the outline of the defense program prepared in October 1976, that it is most appropriate for the self-defense force [SDF] to have the capability of coping with a limited, small-scale invasion. As Mr Fujii pointed out, our understanding was that the SDF would not be expanded so much quantitatively. Now, even Mr Maruyama, who was administrative vice minister at that time, calls for a view of the outline and the LDP plans to commence reviewing it. Does the JSP regard the outline of the defense program as a restraint?

[Ishibashi] No, as I gave our conclusion earlier, there is no restraint at all under the LDP government. The government is using the outline as only a tool to cheat the nation, as a stopgap. The so-called 1 percent of the GNP is no exception. They are already saying that that ceiling cannot be observed. The subcommittee on defense buildup, which is under Mr Mihara's security affairs research council, is clearly asserting that defense spending must surpass the 1 percent ceiling. Adept Mr Mihara only changed words to make it look soft to outsiders. [laughter]

The outline of the defense program also falls in the same category. Actually, that outline is already completely disregarded. In a sense, the present outline of the defense program shows signs of paying deference to the constitution. For instance, I could see in it the hues of defense exclusively for self-defense. But these signs and hues cannot be seen in the least now. What reference is made in the 1981 mid-term work estimate? Nothing. There is only an attached table. Therefore, they themselves are realizing the contradiction of having to start the work of reviewing and revising the 1981 estimate as soon as it is completed. But, since they cannot say that they are disregarding the estimate, they say that once the preparation of the 1981 mid-term work estimate is completed, they will commence reviewing the outline of the defense program immediately. This is a big fraud.

The so-called outline of the defense program, which was adopted at a cabinet meeting, is disregarded. Then, on what basis is the government reinforcing defense potentials now? The Suzuki-Reagan joint statement. Japan has started building up its defense capabilities to keep its promise to the United States. That is our conclusion. I want to add that that clearly shows what goals the Japanese SDF has now.

[Okamura] Mr Fujii, as I have already mentioned, at a joint session of the LDP's three security-related organizations last Wednesday, it was decided that a review of the national defense program outline would be commenced. What do you think of this decision?

[Fujii] In the past, it was said that Japan's defense was aimed at checking limited, small-scale aggression. However, it is now claimed that Japan should be able to cope with global-scale disputes. That is, Japan is now moving towards assuming a role in the new U.S. strategy of multiple retaliation. This is a very risky move. In short, a larger defense buildup will presuppose a larger-scale war. That means we will have to fight a larger war. Therefore, the decision to review the outline is a dangerous move, indeed.

[Okamura] Mr Fujii has just said that the decision is a very dangerous move. Mr Mihara, you said that the work of reviewing the outline might take 2 or 3 years. May I interpret the work of reviewing as that of revising?

[Mihara] Whether the work of reviewing the outline will lead to its amendment or not, we will neither play what you call a trick nor cheat anybody. We do not have the kind of notion which Mr Fujii has just talked about. Perhaps, we have not made enough effort to have ourselves fully understood. Mr Fujii, I would like to stress that the LDP and the government are not seeking what you call uncurbed military buildup nor attempting to turn Japan into a military power.

[Okamura] Thank you very much.

CSO: 4105/147

MILITARY R & D PROGRAMS FOR FY 1982

Tokyo JPE AVIATION REPORT-WEEKLY in English No 563, 17 Mar 82 pp 4-9

[Text] Japan's FY 1982 (April 1982-March 1983) funding for military research and development programs will total ¥50,611 million -- ¥28,507 million in FY 1982 expenditure and ¥22,104 million in follow-on disbursement, up 14 percent over FY 1981. Major R&D items include the MT-X intermediate trainer aircraft, the XSSM-1 ground-launched antiship missile, the Chu-MAT intermediate range antitank missile, the portable surface-to-air missile, the new main battle tank, the high-speed homing torpedo, the deep-sea minesweeping system, the towed array surveillance system (TASS) sonar, the electronic countermeasure (ECM) systems and the electronic warfare simulator.

An outline of major R&D items for FY 1982 follows:

(Aircraft)

MT-X Intermediate Trainer

The MT-X development program started in FY 1981 with Kawasaki Heavy Industries Ltd. (KHI) named prime contractor. Work on a basic MT-X design is now under way with FY 1981 funding. The Japanese Defense Agency's (JDA) Technical R&D Institute (TR&DI) has earmarked ¥7,000 million in the FY 1982 budget for preparation of a detailed design, fabrication of a mockup and a front fuselage section for tests, and other development activities. The TR&DI plans to fabricate four prototypes for flight tests, one for static strength tests and another for fatigue tests under the FY 1983 budget. The MT-X development program would be completed after flight tests between FY 1985 and 1987. The current basic design work was undertaken by a KHI-led engineering team set up last October. In April, it will be joined by engineers of Shin Meiwa Industry Co., Japan Aircraft Mfg. Co. and Ishikawajima-Harima Heavy Industries Co. (IHI), which will undertake development of the outside fuel tank, the pylon, and the powerplant respectively. Other new participants will be developers of the landing gear and the ECS system. Candidates are Sumitomo Precision Product Co. and Kayaba Industry Co. for the landing gear developer, and Shimadzu Corp. and Teijin Seiki Co. for the ECS system developer. As the MT-X powerplant, the TR&DI is testing the XF-3-30 small turbofan, developed by IHI, as a candidate. The XF-3-30 is certain to be adopted for the MT-X by October. Meanwhile, KHI is expected to select an ejection seat system for the MT-X from four candidates, including the ACES 2 and S3S-3ER, by April. Developers of MT-X avionics, including the headup display (HUD), will be named by October.

Hoping to develop the HUD are Mitsubishi Electric Corp., Shimadzu, Nippon Electric Co., Tokyo Keiki Co., Toshiba Corp. and Mitsubishi Precision Co.

Aircraft System Simulator

The FY 1982 budget includes ¥50 million for research on the aircraft system simulator with combat simulation capability, which the TR&DI wants to use for design and development of small aircraft in the future. The TR&DI plans to prepare a design in FY 1982 and fabricate the simulator, the cockpit and the display section between FY 1983 and 1985. Thus, the overall system would be completed by FY 1985.

(Guided Weapons)

XSSM-1 Antiship Missile

The XSSM-1 for the Ground Self-Defense Force (GSDF), based on the ASM-1 air-to-surface missile for the F-1 support fighter, would be launched from inland or coastal areas to attack intruding enemy ships. Fabrication of a full system will start in FY 1982 with funding totaling ¥5,600 million. Compared with the ASM-1, the XSSM-1 would have an improved guidance system. A jet engine would be used instead of a rocket engine for propulsion, although a booster rocket would undertake launching. The fabrication will be completed by FY 1985, followed by tests in FY 1985 and 1986. The new missile's service entry certification is expected for FY 1987.

Chu-MAT Antitank Missile

The Chu-MAT would be a lightweight, small and accurate medium-range antitank missile for the GSDF, carried by both vehicles and infantrymen. The first-phase full-scale fabrication will begin in FY 1982 with funding totaling ¥620 million after component-by-component fabrication ending in FY 1981. The development of the Chu-MAT will be completed by FY 1986 for start of deployment within the FY 1983-87 period for a new defense program.

Air Combat Missile

The TR&DI plans to develop an advanced air-to-air missile for fighter aircraft dogfights. In FY 1982 and 1983, it will conduct work on a system design and fabricate a homing system with ¥540 million earmarked in the FY 1982 budget. The TR&DI intends to fabricate a pre-development system from FY 1983 to 1984 prior to full-scale development work starting in FY 1985.

Portable SAM

The TR&DI has earmarked ¥230 million in the FY 1982 budget for fabrication of test equipment in FY 1982-83 to prepare for full-scale development of a new portable surface-to-air missile which would be an image homing type for head-on attack. The U.S. Army Stinger, which the three Japanese services have adopted, is an infrared missile for tail homing attack. The new portable SAM's development is expected to start in FY 1984 if so requested by the three services.

Precision Guidance Simulator

The TR&DI will complete the precision guidance simulator in FY 1982 for system research and evaluation of future missiles using electron optics. For this project, ¥220 million is earmarked in the FY 1982 budget. So far, key components have been fabricated.

Scanner for Tan-SAM Guidance

The scanner for improvement of the guidance system of the Model 81 Tan-SAM short-range surface-to-air missile is a new research and development item. The FY 1982 budget includes ¥120 million for fabrication of the scanner.

(Ground Equipment)

New Main Battle Tank

The TR&DI/GSDF new main battle tank development program will enter a full-scale fabrication stage in FY 1982. The year's budget will include ¥131 million for preparation of a basic design and fabrication of the turret and munition. The TR&DI intends to obtain funding for fabrication of two prototype tanks in FY 1983-84 in order to complete the first phase of full-scale fabrication. In the second phase, four prototypes would be assembled in FY 1985-86. Mass-production is expected to start in FY 1988. The new tank for the 1990s would weigh 46 to 48 tons and be powered by a 1,500-horse-power diesel engine. It would have a 120mm smooth-bore gun, an advanced fire control system, a laser finder, a night sighting system and other advanced systems. A composite armor structure would be adopted along with a new stabilizer for boosting firing capability during operation. One problem encountered with the new tank development program is whether to adopt a domestically developed 120mm gun. There is a possibility of the U.S. Army M-1 tank's Rheinmetall 120mm gun being adopted for the new Japanese tank.

AW-X Antiaircraft Gun

The AW-X is a self-propelled 35mm antiaircraft gun. A full system will be fabricated from FY 1982 to 1984 with ¥3,090 million earmarked in the FY 1982 budget. The AW-X will consist of a Model 74 tank chassis, a 35mm gun (the Swiss Oerlikon KDA) and an advanced fire control system. A mass production program would be prepared by FY 1986.

Aircraft-Dropped Mine

The TR&DI will complete development of the new aircraft-dropped mine with ¥230 million earmarked in the FY 1982 budget for final-stage fabrication of the mine. So far, it has fabricated prototype mines, dropping equipment, mine supports, bomb racks, dumpers, emergency dropping systems and controls. The new mine's service entry is expected for FY 1983.

20mm Ammunition for CIWS

The 20mm ammunition, made from nickel, chrome and turngsten materials, will be fabricated for the CIWS with ¥60 million set aside in the FY 1982 budget. Its entry into service could be realized by FY 1983.

(Naval Equipment)

GRX-2 High-Speed Homing Torpedo

The GRX-2 is an advanced rocket-propelled homing torpedo for submarines to accurately attack deep-cruising, high-speed enemy submarines. FY 1982 funding totaling ¥1,510 million will enable two-year final-stage fabrication of the new torpedo. It will be tested in FY 1983-84 prior to mass-production starting possibly in FY 1985.

S-7 Minesweeping System

Development of the S-7 deep-sea minesweeping system will begin in FY 1982 with ¥220 million earmarked in the annual budget. The TR&DI plans to fabricate a sailing vessel and towing cable in FY 1982, plus a platform and equipment for towing ships in FY 1983. The S-7 for new-model minesweepers would eliminate deep-set sunk and moored mines.

Torpedo Evaluation System

Research and development of the shallow-sea torpedo evaluation system will be launched in FY 1982 with funding amounting to ¥530 million. The system will detect and evaluate torpedoes in shallow seas through acoustic sensors dispersed in the water. The system would contain a microwave receiver, acoustic source and auxiliary devices for the underwater division, with an input and output processing device, acoustic wave receiver and control display for the onshore division.

TASS Towed Passive Sonar

The TR&DI will launch full-scale fabrication of the TASS (towed array surveillance system) passive sonar in FY 1982 with the year's funding standing at ¥620 million. The TASS, to be mounted on 2,900-ton DD destroyers, would make up for the vulnerability of the active sonar. Evaluation tests of the passive sonar would be conducted from FY 1983 to 1984.

(Avionics)

XJ/ALR-1 ECM System

The XJ/ALR-1 ECM (electronic countermeasure) system is designed to collect various microwave data. The FY 1982 budget includes ¥450 million for fabricating the equipment necessary to install the ECM system in YS-11 turboprop for application tests.

XJ/ALQ-5 ECM System

The XJ/ALQ-5 would be mounted on the C-1 transport to jam ground radar systems. Its development will enter the final phase in FY 1982 with expenditure of ¥1,260 million approved. FY 1982 fabrication work will involve the antenna, transmitter and other components.

ALQ-8 ECM System

The ALQ-8 ECM system is designed for the F-15 fighter aircraft, following the ALQ-2 for the T-33A trainer, the ALQ-4 for the F-104J fighter and the ALQ-6 for the F-4EJ and F-1 fighters. In FY 1982, the TR&DI will assemble equipment for remodeling the F-15 airframe to accommodate the system. The year's funding totals ¥70 million. Remodeling work will begin FY 1983. The ECM system's mass-production phase is expected to start in FY 1984. The TR&DI intends to equip almost all F-15s with the ALQ-8 systems.

Electronic Warfare Simulator

The TR&DI will complete the electronic warfare simulator within three years, starting in FY 1982, under the year's funding of ¥1,290 million. The simulator, starting test operation in FY 1984, will be used to develop advanced ECM and ECCM technology.

Infrared CCD

FY 1982 funding totals ¥800 million for pre-development research on an infrared charge coupled device (IRCCD) for an infrared detection system. Partial fabrication of the device was previously funded in FY 1981. The FY 1982 research work would establish the technical feasibility for the system's full-scale development to possibly start in FY 1987.

CSO: 4120/325

JDA MAY START LASER RADAR DEVELOPMENT IN FY 1983

Tokyo JPE AVIATION REPORT-WEEKLY in English No 568, 21 Apr 82 pp 8-9

[Text] The Japanese Defense Agency (JDA) plans to launch development of a laser radar system jointly with three electronics manufacturers in FY 1983 on the basis of basic research over the past three years.

In the basic research, the JDA's Technical R&D Institute (TR&DI), Nippon Electric Co., Fujitsu Ltd. and Mitsubishi Electric Corp. have confirmed the feasibility of the new radar system being developed. The JDA may seek funding for full-scale development of the system in its FY 1983 budget request to be submitted in late August.

The JDA wants to initiate the new radar development by building on the laser technology now spreading throughout Japanese industry for medical and other equipment. According to the TR&DI, the current radar system's microwave emission angle is two to three degrees, far more than only 0.5 degree for the laser beam. Thus, the laser radar can locate an object more accurately than the microwave radar.

The laser radar, if used for the fire-control system of an antiaircraft gun or a missile, could improve the hit ratio. Problems with the laser radar development, however, include how to deal with heat resulting from laser beam generation, reduce the size and weight of the laser beam generator, and keep the wave length of the laser beam at a certain level. No country seems to have solved those problems.

In the development, the JDA intends to fabricate a radar system with a small, lightweight laser beam generator for tests aboard antiaircraft guns and other weapons systems. It wants to develop the new radar system in two years for deployment starting in FY 1985 or after.

Prior to the development project, the JDA is expected to name one of the three companies as prime contractor, in a departure from its joint research with all of them.

CSO: 4120/325

MILITARY

MITI RELUCTANT TO RELEASE ADVANCED TECHNOLOGIES

Tokyo JPE AVIATION REPORT-WEEKLY in English No 571, 12 May 82 pp 8-9

[Text] The Japanese Defense Agency (JDA) plans to exempt some advanced electronics and other technologies from the candidate technology items to be selected for Japan-U.S. joint research and development, because the industry sector does not want to release some of the advanced technologies to foreign countries, sources say.

The candidate items, which would be presented to the Americans at a regular Japan-U.S. consultation on defense equipment and technology in June, include logistic support facilities, pre-cooked instant food, special winter and waterproof wear, and antiaircraft and antiship missiles, they say.

The United States has strongly demanded joint arms research and development as well as Japan's fast defense buildup. But Japan bans arms and military technology exports.

Irritated by the military technology export ban, the United States has informed Japan that it might suspend military technology transfer to Japan unless advanced Japanese technologies are released to the Americans. Specifically, a U.S. act was enacted last Dec. 15 to ban foreign countries' license production of U.S. gun barrels for 203mm self-propelled howitzers.

The U.S. move has encouraged Japanese quarters concerned to advocate promotion of Japan-U.S. joint research and development of arms technologies because the United States' suspension of military technology transfer to Japan could endanger the Japanese defense industry depending on arms production under U.S. license.

But the Ministry of International Trade and Industry (MITI) is reluctant to release key advanced technologies to foreign nations, because it gives priority to protection of domestic industries from foreign competition. The industry sector also wants to keep very large-scale integrated circuit (VLSI), fine ceramics and other key technologies in secret at present.

The JDA plans to take the industry sector's hope into account in selecting the candidate items for Japan-U.S. joint research and development.

Among the items, the JDA attaches importance to pre-cooked instant food and winter and waterproof wear, which it says the United States cannot afford to develop.

It also intends to make effective use of its past experience in developing unique logistical support facilities, such as the self-propelled pontoons of Hitachi, Ltd.

As for missiles, the JDA thinks it would be significant for Japan to develop antiaircraft and antiship missiles jointly with the United States, which has made no sufficient effort to develop such missiles in the absence of the danger of direct airborne attack on its homeland. The Americans are quite interested to a ground-launched antiship missile now under development by Mitsubishi Heavy Industries Ltd.

CSO: 4120/325

JAPAN TO DEVELOP REMOTE SENSING TECHNOLOGY

Tokyo JPE AVIATION REPORT-WEEKLY in English No 555, 20 Jan 82 pp 8-9

[Text] The Science & Technology Agency plans to develop remote sensing technology for earth observation satellites in five years, starting in the current fiscal year. The FY 1981 budget sets aside ¥110 million for this project.

The remote sensing, which enables wider and repeated earth observation from satellites, would be used for maritime observation, argicultural survey, land utilization study, resources prospecting, environmental surveillance and other studies.

Under the five-year project, the agency, in cooperation with governmental research institutes concerned, will first develop techniques for analysis of geological and biological data which could be collected by satellites through remote sensing. It will also compare satellite observation data with ground observation data to integrate data processing and analyzing techniques. Thus the basic software will be established for remote sensing observation.

Besides the software, the agency will research future sensors aboard satellites for remote sensing, including electronic scanning radiometers and synthetic aperture radar systems, to establish basic data processing techniques.

In the software research, the agency will cooperate with the Geographical Survey Institute, the National Institute of Resources, the National Research Center for Disaster Prevention, the Environment Agency, the Hokkaido Development Agency, the National Institute of Agricultural Science, the Electrotechnical Laboratory, the National Institute for Environmental Studies, the Forestry Experiment Station and other institutes.

Participants in the sensor research will include the National Aerospace Laboratory and the Radio Research Laboratory.

The Science & Technology Agency intends to spend the first three years on development of the separate techniques and the remaining two years on their integration.

CSO: 4120/324

NASDA TO STUDY SPACE MATERIALS PRODUCTION TESTS

Tokyo JPE AVIATION REPORT-WEEKLY in English No 557, 3 Feb 82 pp 8-9

[Text] The National Space Development Agency (NASDA) will fabricate a prototype system for future materials production tests aboard the U.S. Space Shuttle, and study techniques for such tests in FY 1982. The government's FY 1982 budget proposal includes ¥431,716,000 for the project.

The Space Activities Commission decided, in August 1980, on a plan to have Japanese scientists conduct materials production tests on the Space Shuttle in the latter half of the 1980s.

Japan's materials production test system for the Space Shuttle would be equipped with two double racks for materials production tests and one double rack for life-science tests.

The NASDA has been conducting materials production tests on the TT-500 rocket, prior to the tests on the Space Shuttle. Final tests on the rocket are expected for this summer.

H-1 ROCKET PROTOTYPES TO BE FABRICATED IN FY '82

The NASDA plans to fabricate a ground test vehicle and a test flight prototype of the H-1 rocket in FY 1982 with ¥20,474,645,000 set aside in the budget for the new fiscal year. In addition, ¥22,425 million is earmarked in the budget for disbursement in the following years.

The ground test vehicle will be used for adjusting the H-1 rocket to the launching facility in the summer of 1985. In FY 1982, the NASDA will manufacture its first-stage booster (an airframe and an engine), second-stage booster (an airframe and a gas jet system), nose fairing, electronics systems, manufacturing test equipment and launching equipment.

As for the test flight prototype for launching in the winter of 1986, the NASDA will fabricate its first-stage booster (an airframe and an engine), second-stage booster (an airframe and a gas jet system) and nose fairing in FY 1982.

At the H-1 rocket launching site on the southwestern Japanese island of Tanegashima, the NASDA will design and construct a launching facility during the year. For ground tests of the H-1 rocket, it will continue construction of inertial navigation test equipment and other test systems at the Tsukuba Space Center and high-altitude combustion test equipment and other test systems at the Kakuta Rocket development Center.

In connection with the H-1 rocket development program, the NASDA will also develop and test the liquid oxygen and hydrogen tank, the liquid oxygen and hydrogen engine, the liquid oxygen and hydrogen booster system, the third-stage booster motor, the inertial navigation system, electronics systems, the second-stage booster airframe, electric components and other parts in FY 1982.

CSO: 4120/324

NTT WANTS TO USE SPACE SHUTTLE FOR SATELLITE LAUNCHING

Tokyo JPE AVIATION REPORT-WEEKLY in English No 562, 10 Mar 82 p 9

[Text] The Nippon Telegraph and Telephone Public Corporation (NTT) wants to use the U.S. Space Shuttle instead of Japanese-developed rockets for launching communications satellites in the future, according to its communications satellite development program which will be studied by the Space Activities Commission soon.

Under the commission's original plan, the NTT would launch the 550-kilogram CS-3 communications satellite with the Japanese-developed H rocket in FY 1987 after the 350-kilogram CS-2 satellite in February 1983. The CS-3 is designed to transmit about 10,000 telephone circuits.

But communications service using the CS-3 whose capacity would be half that of a foreign full-scale communications satellite is estimated to cost much money.

The NTT intends to use the U.S. Space Shuttle for the CS-3 in order to reduce both launching and service costs. It estimates the Space Shuttle to launch a communications satellite with a larger transmission capacity of 20,000 to 25,000 telephone circuits at one-sixth of the cost for the Japanese-developed three-stage rocket. Furthermore, the satellite would be able to mount two times more fuel for its attitude control rocket. As a result, the satellite's service life would double to 10 years, reducing communications costs sharply. If transmission range exceeds 1,000 kilometers, satellite communications costs would become lower than those for ground telephone circuit communications.

Thus the NTT suggests that Japan's communications satellite program be separated from its rocket development program in FY 1987.

The NTT also plans to launch a four-ton communications satellite with a transmission capacity of more than 100,000 telephone circuits in FY 1995.

CSO: 4120/324

S.E. ASIA HOPES FOR JAPAN'S AID FOR SPACE DEVELOPMENT

Tokyo JPE AVIATION REPORT-WEEKLY in English No 564, 24 Mar 82 pp 9-10

[Text] Southeast Asian nations want Japan to give them economic and technical assistance for space development and launch communications, broadcasting and meteorological satellites for Southeast Asia, according to a survey report compiled by the Society of Japanese Aerospace Companies (SJAC). The SJAC sent a mission to Singapore, Indonesia, Australia, Thailand and India from Sept. 26 to Oct. 15 last year to survey their space industries.

According to the report, only India out of the five nations plans to develop a rocket for launching a satellite. Observation rockets are planned by India and Indonesia, and under study by Australia and Thailand. India has launched SITE, STEP, APPLE and INSAT satellites. Indonesia has also lofted the PALAPA satellite. Australia plans a satellite named DOMSAT. No other countries have satellite-launching projects.

All of the five countries have ground facilities for receiving data from spacecraft, proceeding with communications, meteorological observation and remote sensing through satellites. Indonesia, Australia and India have rocket launch facilities. But Australia, which has no large rockets to launch, expects other countries to use its facilities.

India has the most advanced space technology among the five nations, SJAC reports. Other nations would have to make considerable efforts to increase technological capabilities, the report says. India is, however, far behind Japan in the field of space equipment manufacturing technology.

All of the five nations want Japan to extend technical assistance for space development. Japan should meet the request in order to promote international cooperation as well as space development, according to the SJAC report.

CSO: 4120/324

SPACE-RELATED FIRMS NUMBER 92 IN JAPAN

Tokyo JPE AVIATION REPORT-WEEKLY in English No 567, 14 Apr 82 p 9

[Text] The number of Japanese companies involved in space development stands at 92, according to a survey by the Society of Japanese Aerospace Companies (SJAC).

In the survey, the SJAC sent questionnaires to companies concerned with space development activities in FY 1980. As a result, 75 firms responded that they were engaged in such activities in the fiscal year, and 17 said they experienced space development business before the year.

The Japanese space industry's sales in FY 1980 aggregated ¥126,400 million, increasing over the previous fiscal year, according to the SJAC survey.

Of the FY 1980 sales, exports, centering on ground equipment, accounted for 20.3 percent, and represented a slight increase over the preceding fiscal year.

Imports of space development equipment, which slipped below exports, suffered a small decline. But satellite equipment imports rose conspicuously, indicating Japan's dependence on overseas satellite technology.

The industry's research and development expenses in FY 1980 amounted to ¥6,200 million, corresponding to 5 percent of sales. Such expenses for satellite components came to ¥1,500 million, equal to 15.1 percent of satellite equipment sales.

Space industry personnel in FY 1980 stood at about 6,000 persons, up 1,300 persons or 22 percent over FY 1979. Personnel for the ground equipment field scored a sharp 100 percent increase.

CSO: 4120/324

TR&DI WANTS TO LAUNCH RADAR DEVELOPMENT IN FY '83

Tokyo JPE AVIATION REPORT-WEEKLY in English No 572, 19 May 82 pp 9-10

[Text] The TR&DI and ASDF are expected to request the start in FY 1983 of a five-year program for developing a new antiaircraft warning radar system to meet the ASDF's plan to launch procurement of the new radar in FY 1990.

The new radar with an advanced electronic counter countermeasure (ECCM) capability will replace the outmoded FPS-20 search and FPS-6 height finding radars at eight of the ASDF's 28 radar sites throughout Japan. The remaining 20 radar sites have already been equipped with J/FPS-1 (F3D) or J/FPS-2 (improved F3D) fixed three-dimensional radars developed by the TR&DI. The new radar may be an advanced version of the existing models.

If the TR&DI is authorized to start the new radar development project in FY 1983, it would request developer candidates for proposals and select one prime contractor in that fiscal year.

New radar development proposals would probably be submitted by Toshiba Corp., Nippon Electric Co. and Mitsubishi Electric Corp.

CSO: 4120/324

JAPAN TO SPEED UP ROCKET DEVELOPMENT

Tokyo JPE AVIATION REPORT-WEEKLY in English No 573, 26 May 82 p 9

[Text] The Science and Technology Agency plans to develop a rocket for launching large application satellites four to five years ahead of schedule. Specifically, it intends to complete development of the H1-B rocket for an 800-kilogram satellite by around 1990.

The advancement of rocket development would meet increasing domestic demand for larger satellites. For example, the Nippon Telegraph and Telephone Public Corporation (NTT) is considering the launch of a one-ton communications satellite with the United States' Space Shuttle. The agency intends, by all means, to develop a rocket for such large-capacity satellites on its own, in spite of the NTT plan, which has yet to be authorized by the Space Activities Commission, Japan's highest decision-making body for space programs.

In Japan, the National Space Development Agency (NASDA) has developed the N-II rocket to launch a 350-kilogram satellite into a geostationary orbit.

It is now developing the H1-A rocket as a follow-up to the N-II. The H1-A for a 550-kilogram satellite would be a three-stage booster using liquid oxygen and hydrogen as fuel. The H1-B rocket would be developed after the H1-A.

CSO: 4120/324

MITI TO DEVELOP EARTH RESOURCES SATELLITE

Tokyo JPE AVIATION REPORT-WEEKLY in English No 575, 9 Jun 82 pp 9-10

[Text] The Ministry of International Trade and Industry (MITI) intends to develop an earth resources satellite for launching in the late 1980s, acknowledging the United States, which has given top priority to military aspects in space development programs, could not supply Japan with sufficient resources data collected by satellites in the future.

MITI will seek funds in its FY 1983 budget request for preliminary design work on the new satellite to launch the development in that fiscal year. It completed a conceptual design for the satellite in FY 1980 and tried in vain to obtain funds for development in FY 1981 and 1982.

The earth resources satellite is designed to be capable of identifying 20-meter-or-longer objects on the earth at an altitude of 500 kilometers. Thus it will have the world's highest performance. The United States' Landsat-4, to be launched this year, is able to identify 30-meter-or-longer objects.

It will also feature a microwave radar system for resources prospecting instead of the Landsat solar ray system which could be affected by clouds, especially in Southeast Asia.

MITI plans to develop the earth resources satellite in five years at cost of ¥100,000 million.

The satellite would be launched in late 1987 at the earliest with the H-1 rocket, now under development by the National Space Development Agency.

CSO: 4120/324

CONSTRUCTION OF ATCR DEMONSTRATION MODEL TO BEGIN

OW161141 Tokyo KYODO in English 1117 GMT 16 Jun 82

[Text] Tokyo, June 16, KYODO--The Federation of Electric Power Companies Wednesday accepted a government request for its cooperation in constructing a demonstration model of the advanced thermal converter reactor (ATCR), a Japanese-developed nuclear reactor, on condition the government will positively back the project.

Presidents of the nine regional power utilities making up the federation also decided it would be most desirable to appoint the government-owned Electric Power Development Co. as the chief promoter of the project.

The presidents also reconfirmed the necessity for the power companies to continue their joint study on the use of plutonium as fuel for the existing light water-cooled reactors parallel with the construction of the demonstration ATCR.

The conditional acceptance of the government request by the electric power companies paves the way for the full-fledged development of the reactor, expected to become the mainstay reactor in Japan before the development of a fast-breeder reactor (FBR) for practical use.

The FBR is a nuclear reactor under development in many advanced nations as the reactor for the 21st century. It is designed to fuel itself and, at the same time, produce fuel for other reactors.

The ATCR has been developed by the governmental Power Reactor and Nuclear Fuel Development Corp. A prototype of the reactor, dubbed "Fugen," is already in operation in Fukui Prefecture on the Sea of Japan coast.

The government and the Atomic Energy Commission asked the power companies last January to cooperate in construction of a demonstration ATCR, that burns plutonium recovered from spent nuclear fuel.

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END

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MILITARY

JAPAN MAY GET U.S. ANTIMISSILE DEFENSE

OW130331 Tokyo KYODO in English 9322 GMT 13 Jul 82

[Text] Tokyo July 13 KYODO--The government will study the possibility of acquiring an American antimissile system to protect Maritime Self-Defense Force (MSDF) ships at sea, according to a position paper adopted by the Cabinet Tuesday. Another position paper adopted at the same time states that the government is "interested" in military reconnaissance satellites, but has no plans at present to develop them.

Both papers were prepared in response to questions submitted by Yutaka Hata, an opposition Shinsei Club Upper House member, on the defense of Japan's sealanes and the lessons for Japan of the Falkland Islands dispute.

The American Aegis command and control system is being developed by the Pentagon to counter the threat of antiship missiles, which proved so devastating to British warships during the Falklands fighting.

The Soviet Union is believed to be deploying long-range backfire bombers armed with antiship missiles in a maritime strike role in both the Pacific and Atlantic Oceans.

The Aegis system uses SM-2 standard missiles, a sophisticated fire control system and a multifunction array radar system capable of tracking multiple targets to intercept incoming missiles. The computerized system is to be installed for the first time on the 9,055-ton missile cruiser U.S.S. Ticonderoga, scheduled for launching next January.

According to the Cabinet position paper, the Defense Agency is studying acquiring Aegis missile destroyers to meet the aerial challenge to sealand defense. As currently envisaged, the ships would weigh in at about 6,000 tons, and would be laid down around 1987. However, the position paper states that it will "take some time" to reach a decision, and says it is not now possible to discuss the performance, displacement, number of ships or construction costs for such a program.

Meanwhile, in response to questions on the lessons of the Falkland Islands dispute, the Cabinet said it was interested in military surveillance satellites as a "valuable means of gathering information."

Unconfirmed reports have said that both U.S. and Soviet spy satellites played an important role in the fighting between Argentina and Great Britain, with both nations receiving informaion of enemy naval deployments obtained from tellite pictures. Such satellites, represented by the Soviet Cosmos series and the American Big Bird satellites, are launched into low orbits about 200 miles up from which they can take high-resolution pictures of surface objects. Film is often returned to the earth in special reentry capsules.

France is known to be developing its own independent space surveillance capability, and Japan's ruling Liberal-Democratic Party (LDP) Space Development Committee has itself proposed the launching or reconnaissance satellites to follow developments on the Soviet-occupied northern islands.

In its position paper, the Cabinet termed information-gathering "extremely important" to Japan's so-called "exclusively defensive defense" posture. However, it stated that there are presently "no plans" for a satellite program, reflecting a 1969 Diet (Parliament) resolution limiting Japanese space development to "peaceful purposes."

Nonetheless, the LDP called in June for allowing military space development for defensive purposes "within the framework of the Constitution."

Though a Defense Agency spokesman said no "concrete studies" of the issue are underway, Japan's pentagon is said to be collecting publicly available material on surveillance satellites for information purposes. Even if the legal problems could be overcome, there would remain numerous other obstacles to an independent Japanese space surveillance capability.

The low orbit required for precision photography limits the operational life of military satellites to a year or less, and several must be kept in orbit to provide continuous coverage of a given area. While it is estimated that such satellites would only cost some yen 5 billion each when mass produced, experts say the necessary R and D, launch facilities and other preparations could raise the cost of getting a military satellite program off the ground to about yen 100 billion.

CSO: 4120/340

TRENDS, PROBLEMS IN JAPANESE AGRICULTURE

Tokyo NRI SEARCH in Japanese Jun 82 pp 14-15

[Summary] In October 1980 the Agricultural Policy Deliberation Council submitted a report called "Basic Trends in Agricultural Policy in the 80's." The council outlined basic policies which included balancing supply and demand by means of a price policy through the market mechanism, improvement of productivity by encouraging core farmers, and the maintenance and strengthening of self-sufficiency in food. Responding to this report, there were many opinions from various industrial sectors regarding Japanese agricultural reforms. Some of them were:

1. Avoid overprotective aid from the government and seek spontaneous efforts from farmers for agricultural reforms.

2. Carry out fundamental changes and rationalization of the agricultural budget.

3. Enlarge the scale of management and improve productivity.

4. Introduce market mechanisms and try to match domestic prices to international ones.

5. Establish more advanced agricultural technology and strive to export rice.

One problem facing Japanese agriculture today, especially in the type of land used for farming, is the improvement of productivity by enlarging the scale of management. However, several problems remain to be discussed first.

1. The Method

To promote the turnover of farmland by leasehold, the law has been adjusted to emphasize the right of the lender. This would tend to weaken the foundation of land management as practiced by the lessee. The lessee is unable to make large-scale investment, such as buying large machinery to improve productivity, unless he can be guaranteed the right to lease the land on a permanent basis.

2. Expansion

The enlargement of farmland and the improvement of productivity would generally lead to an expansion of markets and to large-scale reorganization of producers. Unfortunately, in the case of the type of land used for farming, one eager producer's action could block expansion.

3. The Effect of Increased Farmland

Even if the scope of farmland based on leasehold expands, the cost of productivity might not be lower than expected. If low-cost productivity were achieved, the landowner would probably raise the rent and the lessee would have to go along with this if he had made a large investment. If there were more lenders than lessees, the power of lenders would be strengthened and they would absorb the profit from the improvement in productivity.

The effect of large-scale management on farmland has not been very great. The main reason for his ineffectiveness is that large-scale management was considered only a "step" to improve productivity, while the means to "motivate" productivity is incomplete. The most basic way to motivate productivity is to enlarge markets. "Export of rice" is probably an effective solution for this purpose. However, it would be normal to consider expanding the domestic market before going to the overseas market.

Rice is overproduced in Japan. The self-supply ratio of grain is 33 percent out of 100, and, especially the feed grain ratio is low. The difference between domestic and international prices for feed grains is quite large, but if Japan could narrow this gap by improving productivity, there is the possibility that Japan could cultivate new markets in the future. The government could also stimulate production by increasing the amount of its purchases when the price falls. This would eventually lead to the expansion of markets and could promote distribution in the most positive way. The most important thing is to take concrete measures for the "improvement of productivity" and the "expansion of markets."

It is worthwhile for Japanese agriculture to refer to the present agricultural situation in advanced nations and to learn about the growing processes of Japanese industries. However, it is necessary for it to find the direction for long-term prospects in line with Japanese climate and the special characteristics of Japanese agriculture.

CSO: 4105/151

PROTECTION FOR AGRICULTURAL AND LIVESTOCK PRODUCTS, FOOD INDUSTRY

Tokyo NRI SEARCH in Japanese Jun 82 p 18

[Excerpt] The food industry depends heavily upon raw materials and, the degree of mutual dependency between the food industry and raw materials producing sector including agriculture is high. In the case of primary processors, such as flour milling, livestock feed, edible oil and sugar refining, the cost of raw materials accounts for 80 percent of total costs. The cost of processed foodstuffs which have a big demand in the market fluctuates due to the high cost of primary processed products and the use of perishable food whose supply is unstable.

At present the domestic supply capacity of raw materials is insufficient and we have to depend on overseas markets (90 percent of wheat and soybeans, 70 percent of raw sugar and livestock feed). However, various import restrictions are placed on foreign products in order to protect Japanese agriculture and at the same time to sustain a reasonable self-sufficiency ratio in Japan. Therefore, the prices of imported materials necessary for production are kept high compared to international price levels. Under the Food Control System, wheat is sold to producers by the Food Agency without any reference to the international market price. This practice prevents millers from free pricing. On the other hand, the Price Supporting System is applied on edible meat and sugar and the Tariff Quota System has been adopted for imported natural cheese, beer fermentation, biscuits and candies. These systems became the core elements in preventing cost reductions for raw materials and also keep the price of products high. They could prevent Japanese goods, which lack international competitive power, from being taken over by low-price imported goods in the domestic market.

CSO: 4105/152

PLANT COMPLETED TO PRODUCE SATELLITES

OW041006 Tokyo KYODO in English 0714 GMT 4 Jul 82

[Text] Tokyo July 4 KYODO--Nippon Electric Co. (NEC) said Sunday it had completed Japan's first plant for mass production of satellites in Yokohama. A spokesman for Japan's largest semiconductor maker said the company had invested yen 2.5 billion (dollar 9.8 million) in construction of the five-storied plant covering 6,000 square meters. Ryuji Kuroda, space development manager of NEC, said the plant is capable of simultaneously producing 4 major satellites each weighing up to 1 ton.

The plant consists of the five latest facilities—those for satellite assemblying, three axial attitude control test, radio wave interference test, research and development of equipment for loading satellite and antenna research and development.

The plant will shortly start assemblying Japan's first marine observation satellite 1 (MOS 1) now under development using Japan's own technology, the spokesman said.

According to Kuroda, NEC has already developed 15 or 23 satellites so far launched by Japan—12 for scientific purposes and 11 for practical application. Kuroda said the engineering test model of the MOS 1 will be completed by this fall.

Mitsubishi Electric Corp., Toshiba Corp. and Fujitsu, Ltd, are developing a three axial attitude control device and solar cell panel and sensor for the MOS 1, but NEC will be in charge of the most important part--the final assembly, he said.

Kuroda said NEC also hoped to win an order for the second generation major communication satellite "CS3," since NEC's transponder is used not only for Japan's communication satellites but also for the International Communication Satellite (Intelsat). Both NEC and Mitsubishi Electric are competing fiercely for the CS3 due to be launched in 1988.

Nippon Telegraph and Telephone Public Corp. is also studying the possibility of launching a major communication satellite weighing 14 tons.

CSO: 4120/339

SURVEY MADE ON INDUSTRIAL TECHNOLOGY LEVEL

OW101148 Tokyo KYODO in English 1012 GMT 10 Jul 82

[Text] Tokyo July 10 KYODO--Japan has caught up with the United States in many fields of industrial technology but still lags behind in basic scientific research, according to a government survey released Saturday. The findings compiled by the government-operated Agency of Industrial Science and Technology showed that Japan is notably behind the United States in computer software, biochemistry and aerospace technologies. "More creative work is needed in basic research on such things as the design and development of new materials," the report said. "Research is the foundation of Japanese industry."

The survey, conducted last June, focused on 186 industrial products manufactured both in the United States and Japan, some 600 senior researchers were asked to give their personal evaluation of technology levels between the two countries. The Japanese researchers said the United States was superior in 72 products, as against 54 for Japan. They said the two countries were about equal in the remaining 60 items.

Survey respondents said Japan has surpassed the United States and Western Europe in conventional technologies such as video tape recorders, refrigerators, shipbuilding, automobiles and polyvinyl products.

However, the list of high-tech products in which Japan is lagging includes aircraft, communications satellites, and gas turbines for power generation.

In particular, the respondents said, Japan is slow in developing pharmaceutical products, including antibiotics and anticancer drugs, and in semiconductor laser beams, and computer programs.

"The results of the survey show Japan is particularly behind the United States in basic research into new products and industrial design," the agency said.

The only high-tech products in which the Japanese researchers felt Japan was superior to the United States were optical fibers, special steels, vinyl chloride, synthetic dyes and ceramics, the survey said.

CSO: 4120/339

SCIENCE AND TECHNOLOGY

MICROWAVE ABSORBENT COMPOSITE FERRITE DEVELOPED

Tokyo KINO ZAIRYO in Japanese Jan 82 pp 38-46

[Article by Ken Ishino, chief, and Kenichi Ichihara, of Microwave Department, TDK Electronics Co., Ltd.]

[Text] 1. Introduction

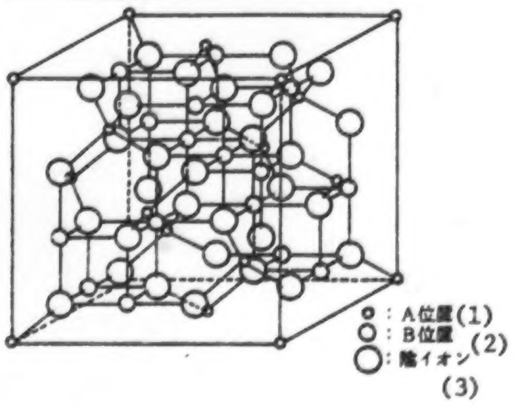
It is very difficult to define the term composite ferrite in a strict sense. We shall discuss it here from the viewpoint of a heterogeneous substance, excluding for now the microscopic composites such as a solid solution (for example, Ni-Zn ferrites) and sintered compounds. It is treated mainly in the sense of a composite material composed of nonmagnetic compounds in which ferrite powder is dispersed. The functions demanded of composite ferrites having a microwave absorption characteristic will be explained, and new research trends will be discussed. Conventionally, the important use of microwave absorbers has been for the absorbent walls of a microwave darkroom.[1-4] As an absorber, it is constructed to hold carbon powder with an appropriate material (for example, foam urethane); it has many characteristics such as light weight, and it demonstrates superior properties over a wide band. On the other hand, in order to obtain the microwave absorption characteristic considered effective as a general absorber, it is necessary to be of a size corresponding to approximately one-fourth the wavelength of the lower band frequency in use, and there is a limit to its conditions for use with respect to size.

In the meantime, demands for thin, wideband microwave absorbers have been increasing recently as a countermeasure to prevent secondary radiation in outdoor microwave measurements and to prevent false radar images generated by a ship's mast, etc.[5] As one of these materials, a new magnetic radiowave absorber is being reevaluated in which the magnetic relaxation phenomenon of ferrite is of interest.[6,7] In the past, it was believed that the only example of composite ferrites, which are nonmagnetic compounds in which ferrite is dispersed, is the so-called "rubber magnet," in which a permanent magnet is used.[8] Recently it was discovered that composite rubber ferrite using soft ferrite has a large magnetic attenuation in the microwave band, and it demonstrates a superior characteristic that fulfills the above-mentioned demand as a microwave absorber for this band and so it is attracting a great deal of attention.[9,10]

2. Various Characteristics of Composite Ferrites

A ferrite is generally an oxide whose chief component is ferric oxide (FE_2O_3). Industrially, it is an oxide magnetic compound which demonstrates strong magnetism at about room temperature. Ferrites can be classified into hard ferrites, used as magnets, and soft ferrites, frequently used as the magnetic core of coils, etc. Soft ferrites are ferrites that can be shown by the general formula $M^{2+}O.Fe_2O_3$

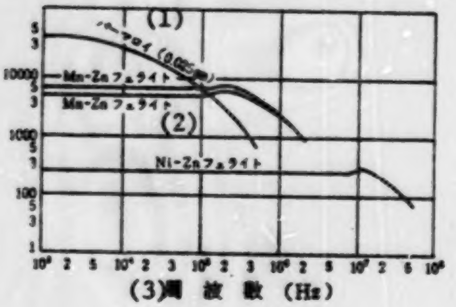
Figure 1 shows the crystalline structure of ferrites. As is clear from the diagram, oxygen ions are positioned coordinately around iron or divalent metal ions in 4-coordination or 8-coordination. The magnetic properties of ferrites vary with the kind of divalent metal ion, the relative position of iron, and the divalent metal ion. Today, several hundred ferrites with varying magnetic characteristics are being used as electronic materials for various purposes. The characteristics of soft ferrites may be expressed by permeability, magnetic flux density, and anisotropy constant, among other things; their respective characteristics are interrelated. If consideration is limited to the ferrites used as microwave absorbers, however, the characteristic of the microwave absorbers is dependent upon the magnetic loss of ferrite. Therefore, we shall discuss here mainly the magnetic-loss characteristics of ferrites--that is, the real number portion (permeability in the ordinary sense) and imaginary number portion (loss term) of the complex permeability in which magnetic loss is also taken into consideration ($\hat{\mu}=\mu'-j\mu''$).



Key:
(1) position A
(2) position B
(3) negative ion

Figure 1. Crystalline Structure of Ferrites[11]

Since ferrites are oxide magnetic materials, they are characterized by the fact that their specific resistance is high compared to metal magnetic materials. In other words, as opposed to about $10^{-6}\Omega\cdot cm$ for metal magnetic materials, the specific resistance of ferrites is $10^2-10^7\Omega\cdot cm$. Consequently, when they are used as a magnetic core material, it is possible to obtain a magnetic core with virtually no eddy-current loss, provided a type of ferrite is selected according to the frequency used. Figure 2 shows the frequency characteristics

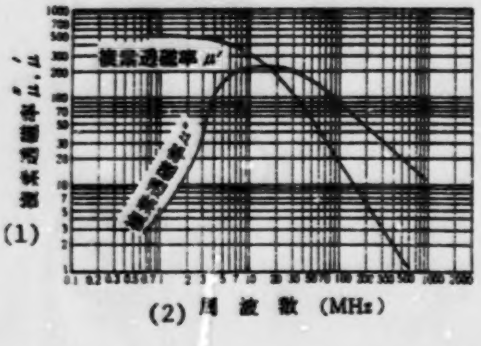


Key: (1) Permalloy
(2) Ferrite
(3) Frequency

Figure 2. Permeability of Ferrites and Permalloy

of the real number portion of complex permeability (μ', simply called permeability hereafter) of Permalloy (metal magnetic material), Mn-Zn ferrite, and Ni-Zn ferrite. The permeability of Permalloy with a low specific resistance decreases with frequency. This is attributable to eddy current. On the contrary, almost a constant permeability value is shown by Mn-Zn ferrite, to approximately 10^5 Hz, and Ni-Zn ferrite, to approximately 10^7 Hz, after which a relaxation type of attenuation caused by magnetic resonance (discussed later), determined mainly by chemical compositions, is observed.[15]

A ferrite microwave absorber has been developed, taking note of this relaxation phenomenon. Figure 3 shows the frequency characteristics of complex permeability of Ni-Zn ferrite, which is in use today to prevent TV ghosts in the 100-MHz band. As μ' decreases, a large magnetic loss (μ'') is observed in the 100-MHz band.[12,13] When a ferrite or composite ferrite is used as a functional material with a microwave absorption characteristic, this $\mu'\mu''$ movement--that is, the frequency characteristic of the complex permeability--becomes the basic characteristic.[16,17] On the other hand, the so-called composite ferrite with ferrite mixed in rubber or plastic by dispersion shows a marked deterioration of permeability, and in the past it was not considered as a magnetic core material.



Key: (1) Complex permeability
(2) Frequency

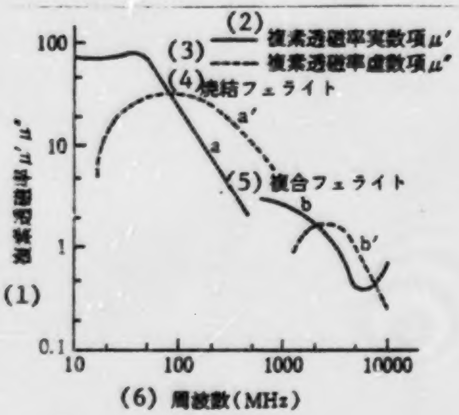
Figure 3. Frequency Characteristics of Ni-Zn Ferrite

Table 1. Changes in Magnetic Characteristics Associated With Mn-Zn Ferrite Composite Formation

	Sintered ferrite	Composite ferrite
Permeability (1 KHz)	2,500	15
Saturation flux density (H=150 Öe)		

A 50 percent volume ratio of ferrite with mean particle size of 3μ was mixed in chloroprene rubber for this composite ferrite

Table 1 shows an example of the characteristics when Mn-Zn ferrite is combined with rubber. We cannot find here the characteristics as a magnetic core material that uses permeability. On the other hand, when the frequency characteristic of complex permeability is examined as a microwave absorber, it has been proven that composite ferrite shows a characteristic behavior in the microwave bands above 1,000 MHz. Figure 4 shows a typical example using Ni-Zn ferrite; "a" is a sintered ferrite, and "b" is a composite ferrite with a rubber mixture. In the case of sintered ferrite, magnetic resonance (discussed later) is observed in the vicinity of 100 MHz and a large loss is shown, whereas in the case of composite ferrite, the same ferrite powdered and mixed with rubber, magnetic resonance is observed in the vicinity of 3,000 MHz and a large attenuation is shown.[18]



Key:
(1) Complex permeability
(2) Complex permeability real number term
(3) Complex permeability imaginary number term
(4) Sintered ferrite
(5) Composite ferrite
(6) Frequency

Figure 4. Changes in Complex Permeability Associated With Conversion to Composite Ferrite

This phenomenon allows us to anticipate the fact that a superior microwave absorption characteristic will be demonstrated in the microwave band because of the characteristic obtained by making the soft ferrite a composite. As a result, composite ferrites have been reevaluated in recent years as microwave absorption materials in the microwave band.

2.1 Ferrite content and magnetic characteristic

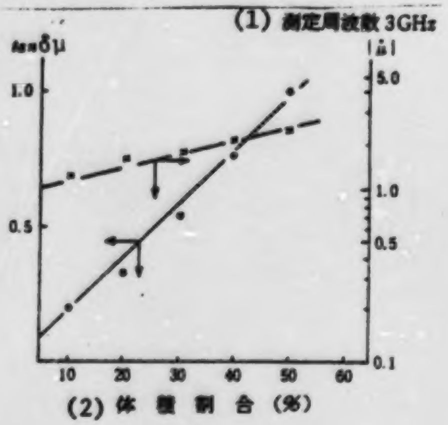
Regarding the magnetic characteristic of a composite ferrite comprising a mixture of soft ferrite and rubber or plastic, Birks performed an experiment earlier using α-Fe_2O_3 and demonstrated the fact that $|\dot{\mu}|$ and $\tan\zeta\mu (= \frac{\mu''}{\mu'})$ obey the mixed logarithmic equation of Lichitnecker shown below.[19]

$$\log|\dot{\mu}| = V\log|\dot{\mu}_a| \qquad 1$$

$$\tan\zeta\mu = V\tan\zeta\mu \qquad 2$$

where the suffix a signifies the characteristic in α-Fe_2O_3. Therefore, when these equations are used, a certain degree of speculation is possible regarding the magnetism for a composite case. However, as discussed later, it will differ by the mean particle size of the ferrite, and it is necessary to confirm it finally by experimentation.

Figure 5 shows the relationship of mixed ratio and magnetic characteristics for Mn-Zn ferrite. As is clear from the graph, the relationships of the volume mixture ratio to $|\dot{\mu}|$ and $\tan\zeta\mu$ reveal the fact that they satisfy Lichitnecker's equations. These relationships indicate that the magnetic loss of composite ferrite ($\tan\zeta\mu$) is proportional to the volume mixture ratio, and in the case of a microwave absorber designed by focusing on the magnetic loss term (microwave absorber for the prevention of microwave leakage), it is necessary to increase the mixture ratio of ferrite.



Key: (1) measured frequency
(2) volume ratio

Figure 5. Relationship of Mn-Zn Ferrite Volume Ratio to $\tan\delta\mu$ [error for $\tan\zeta\mu$?] and $|\dot{\mu}|$

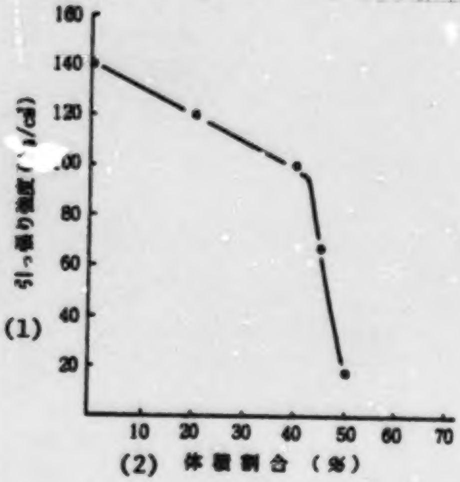
We shall consider here the mixing ratio in the case of a ferrite and resin or rubber mixture. The ferrite used for a composite ferrite is generally a powder made by pulverizing sintered ferrite. When sintered ferrite is pulverized using a ball mill or hammer mill, a powdery substance with a mean particle size of less than 10μ is obtained. Soft ferrites have a cubic crystalline structure, as mentioned before, but pulverized powder takes a relatively random form, such as seen with crushed rocks. This powder has no complex surface structure and does not change with pressure or shearing stress during mixing, and mixing with resin or rubber can be done relatively easily. When such a powder is mixed into rubber or resin and diffused, how much may the mixing ratio be increased? In the case of mixing a powder with liquid, the particles of powder are generally considered spheres, and the ratio of the volume of spheres to the volume of spaces when they are packed in the maximum density is considered the limit of the mixing ratio.[20] When this sphere model is used, the ratio of the volume of spheres to the volume of spaces is approximately 6:4.

Consequently, if we assume that the particles of powder are spherical, the upper limit of the mixing ratio is the volume ratio, which is 60 percent. Naturally, when the shape of the powder particles is not spherical, this value is different. Also, when the size of the powder particles is irregular, the value is expected to be greater than the above ratio (in the case of the above-mentioned model, for example,if there are spheres small enough to fill the spaces, the volume ratio held by the spheres increases). In the case of soft ferrites, it is empirically possible to mix up to a volume ratio of 70 percent. This is believed to be due to the fact that the shape of the particles is not spherical, and there is a certain degree of distribution of the particle sizes.

However, the mixing ratio that is industrially feasible is lower than the above value. The reasons are: (1) mixing takes a considerable amount of time, and (2) mechanical properties deteriorate. The second reason is believed to be due to the fact that the powder particles are not completely coated with resin or rubber because the mixing ratio is at the upper limit, and the bonds between the particles become weaker. In addition, there is virtually no interaction between the particles and resin or rubber, and the bonding between the particles and the resin is weak. Figure 6 shows the relationship of the volume mixing ratio and tensile strength in the case of Mn-Zn ferrite powder mixed and dispersed in chloroprene rubber. It reveals the fact that the strength rapidly deteriorates as the volume ratio increases higher than 45 percent. This indicates that there is almost no interaction between the ferrite particles and chloroprene rubber. This is believed to be due to a physical lack of a complex surface structure and chemical activity because it is a stable oxide.[21] Owing to the above reasons, the mixing ratio for mixing and diffusing ferrite powder in resin or rubber is limited to render 70 percent in volume ratio.

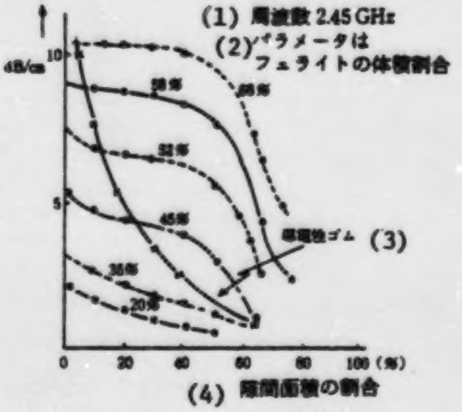
In the case of a microwave absorber (an absorber used for prevention of microwave leakage), as previously mentioned, an increase in the mixing ratio of ferrite is required, and a way to upgrade the electrical characteristics without reducing the mechanical properties is being sought by adjusting the particle size and distribution of particle sizes and the use of surfactants, etc. A typical application example of a microwave absorber using only the magnetic loss of composite ferrite is the gasket for prevention of microwave leakage in a microwave oven. For this purpose, a composite ferrite with Ni-Zn ferrite or Mn-Zn ferrite mixed in rubber or plastic is used.

In the case of the composite ferrite microwave absorber, it is not only superior in its microwave absorbing effect, but it also has a microwave converging effect, as shown in Figure 7. Thus, unlike the conventional conductive rubber



Key: (1) tensile strength
(2) volume ratio

Figure 6. Tensile Strength of Composite Ferrite Formed by Mixing and Diffusing Mn-Zn Ferrite in Chloroprene Rubber



Key: (1) frequency
(2) parameter is the volume ratio of ferrites
(3) conductive rubber
(4) ratio of space volume

Figure 7. An Example of Microwave Converging Effect

gaskets, a completely sealed state is not required, and the microwave-leakage-prevention effect is not lost even when a slight gap occurs. As shown in Table 2, various kinds of composite ferrites are now in practical use as radiowave leakage preventive absorbers in the microwave band, including those for microwave ovens.

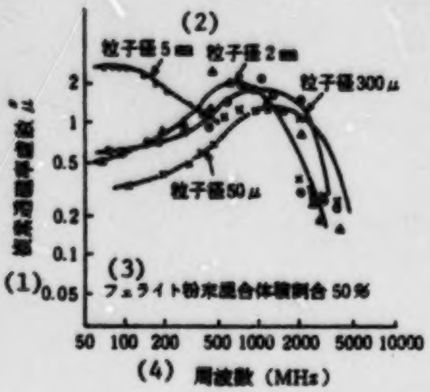
Table 2. Composite Ferrite Microwave Absorbers Used for Microwave Leakage Prevention (from TDK Catalog)

Material	IR-B006	IR-B006PE	IR-B006P	IR-B006M	IR-B006H	IR-B006S
Highlight	Flexible	Flexible	Rigid	Rigid	Hard High temperature resistance	Flexible High temperature resistance
Frequencyrange	500MHz and up	500MHz and up	500MHz and up	500MHz and up	500MHz and up	500MHz and up
Basic composition	Ferrites in chloroprene rubber	Ferrites in polyethylene chloride rubber	Ferrites in polypropylene resin	Ferrites in polyamide resin	Ferrites in unsaturated polyester	Ferrites in silicon rubber
color and surface	Black smooth	Black smooth	Black smooth or mat	Black smooth or mat	Black smooth or mat	Black
Cover		Coverless	Coverless	Coverless	Coverless	
Operating temperature	Up to 100°C	Up to 100°C	Up to 65°C	Up to 150°C	Up to 200°C	Up to 300°C
Manufacturing process	Extrusion Compression	Extrusion	Injection	Injection	Compression	Compression
Attenuation at 2.45GHz	12 dB/cm and greater	12 dB/cm and greater	12 dB/cm and greater	12 dB/cm and greater	12 dB/cm and greater	12 dB/cm and greater
Oil resistance	Good	Good	Good	Good	Good	Good
Spilled food resistance	Good	Good	Good	Good	Good	Good
Density	3.3	3.2	2.9	3.0	3.4	3.3
Tensile strength	10 kg/cm² and higher	10 kg/cm² and higher	10 kg/cm² and higher	10 kg/cm² and higher	10 kg/cm² and higher	10 kg/cm² and higher
Flexial strength	N/A	N/A	1.5 kg/mm² and higher	1.5 kg/mm² and higher	1.5 kg/mm² and higher	N/A

2.2 Frequency Characteristics of Complex Permeability

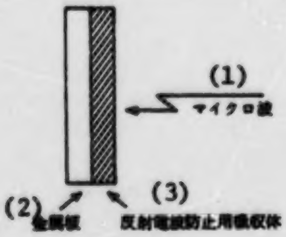
As has been described, a magnetic relaxation phenomenon of composite ferrites is observed in the microwave band, and a large attenuation occurs. The magnetic losses conceivable in the high-frequency band include various kinds of losses such as hysteresis loss, eddy-current loss, etc. In the case of composite ferrites having a large specific resistance, a relaxation type of loss attributable to magnetic resonance is believed to be the major loss. Generally, the frequency at which magnetic resonance occurs, ω, is given by $\omega = \partial Hi$. [$\omega (= 2\pi f)$: resonance frequency, Hi: internal magnetic field (anisotropy field), ∂: gyromagnetic ratio (constant)]. According to this equation, as Hi changes, the resonance frequency changes, and it is possible to obtain magnetic resonance in the desired frequency by controlling Hi.

The internal magnetic field, Hi, of a composite ferrite changes depending on the type of ferrite, the particle size, the mixing ratio, etc. Figure 8 shows the frequency characteristic of μ'' when the particle size of Mn-Zn ferrite is varied from 50μ to 5mm. Resonance frequency also changes depending on particle size. In addition to its use as a microwave leakage preventive absorber, in which magnetic attenuation alone is of interest, a microwave absorber may be considered in designing an antireflective microwave absorber that suppresses microwave reflection in a structure. Particularly in recent years, antireflective microwave absorbers are being reevaluated in connection with the development of microwave communications.[22] Along with the required loss of microwave due to absorption in the required frequency range, this type of microwave absorber needs to satisfy the condition that the microwaves not reflect off the surface of the microwave absorber in the frequency range (electrically, impedance of free space is equal to the surface impedance of the microwave absorber). In order to satisfy this condition, attention should be drawn not only to the μ" size in the loss term of complex permeability, but also to the frequency characteristic of complex permeability including μ'.



Key:
(1) complex permeability imaginary number, ∂"
(2) particle size
(3) ferrite powder mixing volume ratio
(4) frequency

Figure 8. Relationship Between Particle Size and Magnetic Characteristic



Key:
(1) microwave
(2) metal plate
(3) antireflective microwave absorber

Figure 9. Construction of an Antireflective Microwave Absorber

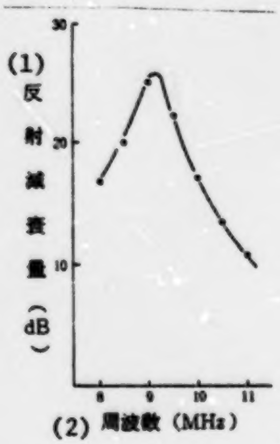
An antireflective microwave absorber is constructed, as shown in Figure 9, lined with a conductor such as a metal plate. It is necessary that the apparent values of electromagnetic properties of the free space be the same as the electromagnetic properties in the construction shown in Figure 9 (in order to prevent microwave reflection), which is fairly complex. The reflection coefficient, T, at the surface of the absorber, is given by the following equation:

$$\dot{T}_0 = \frac{\dot{T}_0 - e^{-2i\dot{\gamma}d}}{1 - \dot{T}_0 e^{-2i\dot{\gamma}d}}$$

w..ere $\dot{T}_0 = \frac{\sqrt{\dot{\mu}/\dot{\epsilon}} - 1}{\sqrt{\dot{\mu}/\dot{\epsilon}} + 1}$ $\quad j = \frac{2\pi}{\lambda}\sqrt{\dot{\mu}\dot{\epsilon}}$

in which $\dot{\mu} = \mu' - j\mu''$ $\quad \dot{\epsilon} = \epsilon' - j\epsilon''$, and d is the thickness.

Consequently, when the thickness of the absorber, d, is made constant in the target frequency range, frequency characteristics of $\dot{\mu}$ and $\dot{\varepsilon}$ where $|T|$ is the minimum are necessary. In the case of composite ferrites in general, since the frequency characteristic of ε shows an almost constant value, material is selected in actual application by focusing on the frequency characteristic of $\dot{\mu}$. Figure 10 shows an example of the characteristic of an x - Band (9 GHz band) antireflective microwave absorber (the absorption characteristic is expressed with the attenuation for the reflection level of the metal plate). Compared with the reflection off the metal plate, attenuation of more than 20 dB (less than 1 percent reflection) is being obtained over a frequency range of 1 GHz or more. Figure 11 shows the frequency characteristic of the complex permeability of the microwave absorber. Not only the μ'' level but also the $\mu'\mu''$ characteristics in the 9 GHz band are attributable to the superior reflection attenuation shown in Figure 10.



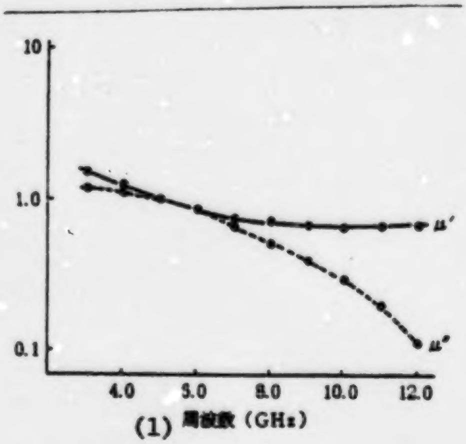


Figure 10. Example of Characteristic of an Antireflective Microwave Absorber Using Composite Ferrite

Key: (1) attenuation of reflection
(2) frequency

Figure 11. Frequency Characteristic of Complex Permeability

Key: (1) frequency

3. Trends in Composite Ferrite Microwave Absorbers

A composite material of chiefly rubber and ferrite was initially used for composite ferrite microwave absorbers. Subsequently, composites with resin have been produced, and today, composites with many organic materials are being produced. This is due to the fact that the chemical and thermal stabilities of composite ferrites are determined by the organic binding materials that are used as binders. Thus, various expansion has occurred with respect to materials, and many attempts are being made in manufacturing techniques as well.

Here, we shall discuss briefly the "manufacturing of composite ferrite by flame spraying" and "composite ferrite functional material" reinforced with glass fibers as recent trends for a composite ferrite microwave absorber.

3.1 Manufacturing of Composite Ferrite by Flame Spraying

Flame spraying is a method in which metal or resin in powder form is jetted out along with an arc, plasma, or flame from the tip of a nozzle so as to have it melt and adhere onto the substrate. It is in practical use today as a surface treatment for metals. On the other hand, the construction of a composite ferrite microwave absorber is frequently done to contain it in a metal frame and use it in contact with metal, both in the case of the antireflective microwave absorber lined with a metal plate and the microwave oven gasket used as an absorber to prevent microwave leakage.

The application of flame spraying to composite ferrites is conceivable as one of the methods to mount the material on a complex structure in order to simplify fabrication, fitting work, etc. Specifically, the idea is to form a composite ferrite coat onto a metal plate by jetting out a mixed powder compound consisting of a thermoplastic resin and ferrite powder, using flame spraying which is used in resin spraying. An example of the experimental approach is described below. The resins used were nylon 12 and polyethylene, and these resins and ferrite were sufficiently mulled in advance and then pulverized for use. A composite ferrite coat can be obtained by following the basic particulars for flame spraying, such as gas flow rate, temperature of the metal plate, and adjusting the distance between nozzle and metal plate.

However, the surface condition of the coat varies, depending on the amount of ferrite used and the particle size of the pulverized ferrite-resin mixture. For example, when ferrite was mixed with resin in volume ratios ranging from 10 to 60 percent and the pulverized particles were sprayed, the spray coat formed was flat without pinholes in the case of ferrite volume ratios of up to 35 percent.

Table 3 shows the ferrite mixing ratio and the specific gravity of the sprayed coat. The specific gravity of the sprayed coat is shown as the ratio to the theoretical value obtained from the mixing ratio of the coat. As is clear from this table, the specific gravity of the sprayed coat decreases as the volume ratio of the ferrite increases. This indicates that the number of pinholes in the coat is increasing. This is due to the fact that when the ferrite ratio in the resin increases, the viscosity of the resin upon melting increases and the resin does not flow on the metal plate, but deposits sediments on the metal plate, maintaining the form of the powder compound as shown in Figure 12.

Table 3.

Composition (volume ratio)	40 percent	50 percent	60 percent
Specific gravity	92 percent	88 percent	72 percent

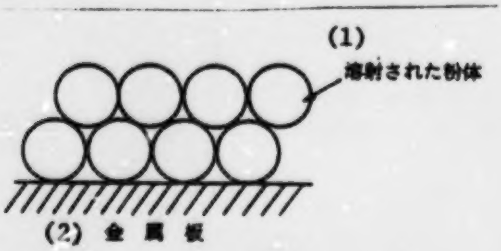
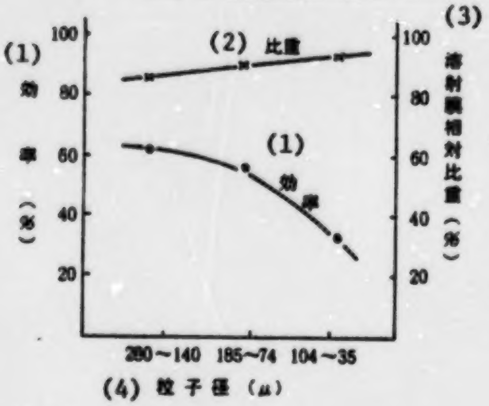


Figure 12. Structure of Sprayed Coat When Particles With High Ferrite Content Were Sprayed



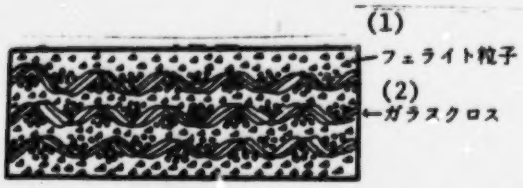
Key:
(1) efficiency
(2) specific gravity
(3) relative specific gravity of the sprayed coat
(4) particle size

Figure 13. Relationship of Sprayed Particle Size to Efficiency and Specific Gravity of the Sprayed Coat

Meanwhile, the effects of the particle size of the powder compound on the sprayed coat were examined, and the results are shown in Figure 13. Particle size affects both the specific gravity of the sprayed coat and spray efficiency. One way to form a sprayed coat with fewer pinholes is to reduce particle size. Favorable results were obtained in the formation of a composite ferrite coat when the mixing ratio of the ferrite was less than 35 percent in volume ratio. A practical application is awaited for the antireflective microwave absorbers in the microwave band.

As discussed previously, composite ferrite microwave absorbers are being used in various ways. As usage expands, not only the microwave absorption characteristics but also various kinds of durability have become necessary. For example, they include durability against heat aging in the case of an absorber for preventing microwave leakage used in microwave ovens, weatherability for outdoor use and mechanical strength for mounting onto a structural part in the case of microwave absorbers for preventing the reflection of microwaves, and so forth. In response to these requirements, the type of resin or rubber used as the binders has been varied, but no fundamental solution has been achieved in respect to mechanical strength. Particularly when the ferrite content is high, the strength often decreases, even to a value lower than the original strength of resin or rubber. In order to increase the strength of composite ferrites and endow the function of a structural material, a composition with glass fibers or carbon fibers has been attempted recently. Composition of glass fibers and resin has been practiced for a long time and is widely used as FRP. This technique is being applied to improve the strength of composite ferrites.

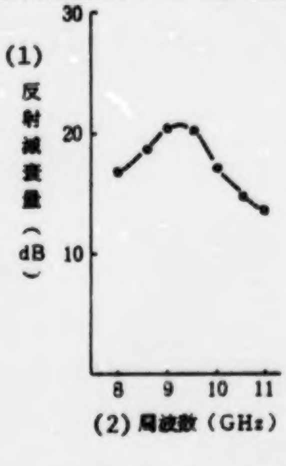
This attempt began recently, and studies are being carried out as to the electrical characteristics, mechanical strength, etc., of the antireflective microwave absorbers that can be used as a structural part. Figure 14 shows a cross-sectional diagram of the composite ferrite absorber using glass cloth, currently under investigation. The structure is ferrite powder scattered between layers of glass cloth.



Key: (1) ferrite particles
(2) glass cloth

Figure 14. Structure of Microwave Absorber Structural Material (Resin is epoxy resin)

By forming this structure, a composite ferrite having a flexural strength of more than 20 kg/mm^2 has been obtained. Figure 15 shows the characteristic curve of a microwave absorber for preventing microwave reflection, which was built with a composite ferrite having this structure.



Key: (1) attenuation of reflection
(2) frequency

Figure 15. Characteristic Curve of an Antireflective Microwave Absorber Made of Microwave Absorber Structural Material

When the amounts of glass, resin, and ferrite powder are controlled, more than 20-dB attenuation of reflection is obtained. However, in order to control the amounts of these three components, it is necessary to add a new element to the FRP manufacturing technique used thus far, and the problems remaining for the future are extensive.

4. Conclusions

Ferrites (soft ferrites), which played a big role in the development of the electronics industry as high-frequency, low-loss, core materials, are being reevaluated as new microwave absorbers associated with the versatile use of microwaves in today's progress in electronics equipment and consequent production of unnecessary microwave reflections leading to microwave pollution. In view of the operational principle of microwave absorbers and the high-frequency magnetization mechanism of composite ferrites, they are among the most promising materials for microwave absorption to be used for microwave-pollution countermeasures by controlling the material constant. If it becomes possible to provide a functional material by further induction of new composite technology, we believe that an immeasurable range of applications exist, including structures that handle microwaves--not to mention electronics equipment.

BIBLIOGRAPHY

1. Morita and Suetake. DENSHI TSUSHIN GAKKAI RONBUNSHI [PROCEEDINGS OF THE ELECTRONICS COMMUNICATIONS SOCIETY] 44, 1961, p 429.
2. Shimizu and Suetake. Ibid 53, 1970, p 143.
3. Ojima, et al., MITSUBISHI DENKI 33, extra issue, August 1959, p 103.
4. Tanaka and Okakura. TOSHIBA REVIEW 15, 1960, p 47.
5. Uda. TELEVISION 24, 1970, p 782.
6. Ishino and Yokoyama. DENSHI KEISOKU [ELECTRONICS MEASUREMENT], June 1972.
7. Ishino, Watanabe, and Hashimoto. OHYO BUTSURI [APPLIED PHYSICS] 43, 1974, p 71.
8. Makino. "Science of New Industrial Materials." FUKUGO ZAIRYO [COMPOSITE MATERIALS] IV.
9. Naito, Suetake, Fujiwara, and Sato. PROCEEDINGS OF THE ELECTRONICS COMMUNICATIONS SOCIETY 52, 1974, p 26.
10. Naito, Suetake, Fujiwara, and Sato. Ibid 52, 1969, p 242.
11. Nakahira. "Crystal Chemistry," Kodansha.
12. Chikazuno, F. "Physics of Ferromagnetic Compounds," Shokabo.

13. Ohta, K., "Basics of Magnetic Engineering," I, II, Kyoritsu Shuppan.

14. "Magnetic materials," compiled by Funtai Funmatsu Yakin Kyokai [Powder Metallurgy Association] Nikkan Kogyo.

15. Snoek, J.L., "New Developments in Ferromagnetic Materials."

16. Yamashita, Ono, et al., SHINGAKUSHI [J. COMMUNICATIONS SOC.] J-61-B, (8), 1978, p 729.

17. Ishino, Ono, et al., Shingakkai [Communications Soc.] ZENDAI, 1974, p 933.

18. Ishino and Hashimoto. CHEMISTRY AND INDUSTRY 28, (9), 1975, p 114.

19. Birks, J.B., PROC. PHYS. SOC. (London) 1948, p 60.

20. Sato, K., "Physical Characteristics of Packing Polymers," Riko Shuppan.

21. Ishino and Ichihara. CERAMICS 14, No 3, 1979.

22. Mizuno and Takahashi. "Space Electronics Research Data" Tsushin Gakkai [Communications Society], SANE 74-28, 1975-1.

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POLITICAL AND SOCIOLOGICAL

GRASSROOTS MOVEMENT FOR CONSTITUTIONAL REVISION DISCUSSED

Tokyo GENDAI NO ME in Japanese May 82 pp 227-235

[Article by investigative reporter Tatsuya Sato: "A Grassroots Constitutional Revision Movement That Has Begun To Stir"]

[Text] Beginning of a "Grassroots" Constitutional Revision

On 21 March over 200,000 people gathered in Hiroshima to oppose nuclear weapons and to ask for arms reduction under the slogan "No more Hiroshima." Growth of the movement at the grassroots level was emphasized.

On 7 September, about a hlaf year earlier, another gathering was held in Hiroshima City. The Kenshin Hall, where the gathering was held, is located near the epicenter of the Hiroshima atomic bomb explosion. Almost all the seats were filled before the scheduled meeting time, and spare folding chairs were arranged. Almost 900 people crowded into the hall.

When the program started at 6 pm, the lights were turned off in the hall and a movie began. The movie, entitled "Now, Let's Reexamine the Constitution," was produced by Ishihara Productions. It lasted for about an hour. Commentary by well-known hawkish intellectuals such as Takeshi Muramatsu, Jun Eto, and Hideaki Kato provided the background while the situation at the time of the constitution's adoption was shown in a news report style. The film persistently presented the image of "a forced constitution" and "a defective constitution."

After the movie, Toshiro Mayuzumi, a composer known as a "superhawk," gave a lecture commemorating the gathering.

"Why was an atomic bomb dropped in Hiroshima? Because Japan did not have atomic bombs," began Mayuzumi. For over an hour he severely criticized the present constitution. He concluded his lecture with the words "In order to protect peace, now let's reexamine the constitution."

The gathering was called "the Inaugural Ceremony of the Hiroshima Prefectural Citizens Council To Protect Japan--Hiroshima Prefectural Citizens Assembly To Contemplate Japan's Security." Hiroshima is the 30th prefecture to have an organization with the name "xx prefectural citizens council to protect Japan."

The same sort of organization was inaugurated in Osaka 2 days earlier and in Aichi Prefecture on the next day, 8 September. Then, "The National Council To Protect Japan," the central organ for the prefectural citizens councils, was formally inaugurated in Tokyo in October.

"The National Council To Protect Japan" is established on the base of prefectural citizens councils such as the one formed in Hiroshima. What is its purpose? It is none other than to gather together all factions favoring constitutional revision and to create a constitutional revision movement at the grassroots level. While the grassroots antinuclear and arms reduction movements have been rising, a serious grassroots movement for constitutional revision also has begun.

The inaugural ceremony of "The National Council To Protect Japan" was held at the Hotel New Otani on 27 October. After singing "Kimigayo"--the national anthem--Toshiro Mayuzumi, the chairman of the Preparatory Committee for the National Council To Protect Japan, made an opening speech. "There is no time like the present to reexamine the constitution. The MIshima incident 8 years ago, after all, ended like fireworks. Live charcoal lighted by the incident, however, still remains. With this valuable live charcoal left by our predecessor, we would like to fire a movement toward constitutional revision. We want to become a trigger for it. This is the purpose of organizing The National Council." He clearly declared the purpose behind the organization of The National Council. Then, guests such as then LDP Secretary General Yoshio Sakurauchi, Democratic Socialist Party premanent counselor Ikko Kasuga, and former President of the Japan Medical Association Taro Takemi gave speeches. The declaration was adopted and the ceremony ended.

The members of the National Council are:

(Officials)

Chairman: Shun'ichi Kase (former ambassador to the United Nations)
Steering Committee Chairman: Toshiro Mayuzumi (composer)
Secretary General: Hiroyuki Soejima (Deputy Priest of Meiji Shrine)

(Sponsors)

Masaru Ibuka (honorary chairman of the Sony Corporation)
Seiichi Uno (professor emeritus of Tokyo University)
Jun Eto (professor of Tokyo Engineering University)
Yoshio Oishi (professor emeritus of Kyoto University)
Kiyotaka Kasugano (president of Japan Sumo Association)
Nichii Kaneko (chief priest of Ikegami Honmonji Temple)
Tadashi Saito (editorial counselor of the JAPAN TIMES)
Takeshi Sakurada (honorary chairman of the Japan Federation of Employers' Association)
Nobutaka Shikauchi (president of the Sankei Shimbunsha)
Yasuo Shinoda (president of the Central Agency for Shrines)
Ikutaro Shimizu (former professor of Gakushuin University)

Koin Takada (chief priest of Nara Yakushiji Temple)
Taro Takemi (former president of the Japan Medical Association)
Shigeo Nagano (chairman of Meiji Shrine Parishioners' Association)
Shocho Hagami (chief priest of the Tendai Sect's Enryakuji Temple)
Shinsaku Hogan (counselor to the International Cooperation Agency)
Ryugen Hosokawa (political critic)
Kozo Masuda (ninth rank professional Japanese chess player)
Mitsuro Muto (guest professor of Waseda University)
Yoshitsu Muramatsu (critic)
Takeshi Muramatsu (professor of Tsukuba University)
Nobuko Yamagishi (former president of the Japan Women's League)

(Supporters number over 230.)

They comprise a wide variety of people. Along with the well-known hawkish names, the names of Japan Sumo Association President Kiyotaka Kasungano, ninth rank Japanese chess player Kozo Masuda, former Japan Women's League President Nobuko Yamagishi appear. Furthermore, among the supporters are flower arranger Yasuko Ikenobo, actor Koji Tsuruta, comic storyteller Nekohachi Edoya, Tokyu Corporation President Noboru Goto, and Mitsukoshi President Shigezo Okada. These examples suggest the broadness of the base.

Originally, "The National Council To Protect Japan" was created on the basis of "The National Council To Realize Era Name Legislation" (the chairman was the late former Supreme Court Chief Justice Kazuto Ishida), which promoted the passage of era name legislation in 1979. Well-known ultraright religious groups such as Seicho-no-ie, the Central Agency for Shrines, Busshogonenkai [a Buddhist organization], and the Unification Association (International League To Conquer Communism) primarily organized "The National Council To Realize Era Name Legislation." It established a prefectural citizens council in each prefecture. It had every prefectural assembly except Okinawa and 1,641 local assemblies throughout the country adopt resolutions supporting passage of era name legislation. Then, a bill was introduced in the Diet and passed. Although "The National Council To Protect Japan" was organized primarily by the rightwing religious groups that had been active in the movement to realize era name legislation, its membership extends to intellectuals, entertainers, and businessmen. It has gathered in one camp every constitutional revision faction in politics, business, and bureaucracy, academia, the entertainment field, and religion. This makes "The National Council" different from previous constitutional revision movements.

Certainly, constitutional revision has consistently been one of the most important goals of rightwing groups. No matter what its size, there is no rightwing group that does not support constitutional revision. As general organizations for the constitutional revision movement, there are two: The Diet Members' Union for Realization of an Autonomous Constitution and The National Council To Establish an Autonomous Constitution. These two organizations are, however, virtually the same. The chairman of both is former Prime Minister Nobusuke Kishi. The two organizations share one office. The Diet Members' Union was founded in 1955. It was organized by LDP Diet members. Kakuei Tanaka, the black general of the political arena, joined the Diet Members' Union in May of last year. It has increased its membership by almost 170 in the last 2 years. Now, the total membership numbers 288 in both houses. Since it is an organization of Diet members, however, it cannot organize a bottom-up movement.

The National Council To Establish an Autonomous Constitution is an umbrella organization for all rightwing groups in Japan. In addition to the Diet Members' Union and ultraright religious groups such as Seicho-no-ie and the Central Agency for Shrines, old military-related groups such as the Japan Survivors Association, the Military Pension Recipients Union, and Reservist Friendship Association have joined in it. Although the scale of the organization is large, ist only activity is to hold "The National Meeting To Request Establishment Of an Autonomous Constitution" each May. It has never been able to activate a movement to stir up public opinion systematically at the grassroots level. In spite of the existence of those two organizations, they decided to organize "The National Council To Protect Japan" because they reflected upon the failures of previous high-level constitutional revision movements. The success of era name legislation taught them many lessons. While maneuvering the Diet in the center, they tried to rouse public opinion by utilizing entertainers and intellectuals. Moreover, they tried to organize local groups and use them to maneuver in local assemblies. As a result, they succeeded in "surrounding cities with villages." By following this example, the National Council intends to realize constitutional revision. Its final goal is a complete revision of the constitution. Although the debate is heated, constitutional revision cannot be realized immediately. All the participants in the National Council know this. Their immediate goal is to discuss education and defense issues which tend to draw people's attention. Then, by doing this they "intend to create an atmosphere where there is no choice but constitutional revision as a result. We shall achieve our goal 5 or 10 years from now." In this sense, it can be said that a real constitutional revision movement has begun 36 years after the war.

Focus on the 1983 General Election

"The National Council To Protect Japan," a joint force of all constitutional revision factions, is not only tries to propagate a mood for constitutional revision but also possesses rather specific and clearcut programs and strategies for constitutional revision. It is necessary to pay attention to this point. Its program is to: (1) try to mold grassroots opinion in the 3 years from 1981 through 1983 by discussing issues such as defense and education which tend to draw people's interest while organizing local groups; and (2) plan to increase the number of conservatives in the 1983 general election and to undermine middle-of-the-road forces in order to strengthen the constitutional revision factions. Their strategy is a policy of an organized movement using the so-called "two-stage revolution method."

In the declaration adopted at its inauguration on 27 October, three topics were pointed out for the National Council: (1) let's have Japanese protecting the Japanese people; (2) let's establish Japanese education based on Japanese tradition; and (3) let's bravely discuss constitutional issues. "Our objective is, while holding high those three suggestions, to develop a broad national movement in order to make a historic decision for Japan's future in the national election of 1983."

Furthermore, according to the organization's internal materials, more specific goals have been set for activities in the 3-year period.

"To Create a National Movement"

3-Year Prospective Plan for a Constitutional Revision Movement

.1981

(1) To develop a broad teaching movement to reexamine the constitutional issue through the issues of defense and education.
(2) To organize prefectural citizens councils and a national council as basic organs to promote the teaching movement.

.1982

(1) As a result of prefectural citizens movements, have resolutions promoting peace and security adopted by local assemblies in 47 prefectures and 3,000 cities, towns, and villages throughout the country.
(2) Organize citizens councils in cities, towns, and villages (3,000 cities, towns, and villages throughout the country) in order to develop each prefectural citizens council to a broad extent.

.1983

(1) With the achievement of the local assembly resolution movement in each prefecture and through the organizational power of each prefectural citizens council and municipal citizens council, hold a "prefectural citizens indignation meeting" to stir up public opinion.
(2) Assume that elections to both houses and the unified local elections, which are scheduled in 1983, will be defense elections, suggest the policies of the national movement to every party and achieve the coalescence of all constitutional revision factions.

For these purposes a series of lectures across the country intended to gather 100,000 people were held last summer. The group of lecturers included former Chiefs of Joint Staff HIroomi Kurusu and Goro Takeda and the Tsukuba University of Nobuyuki Fukuda, Takeshi Muramatsu, and Yatsuhiro Nakagawa.

Moreover, a total of five movies--"Now, Let's Reexamine the Constitution," "The Northern Defense That Is Threatened," "Gate of Ice and Snow," "The Strait of Hormuz," and "The Security and the Constitution of Japan"--were produced or prepared for the movement. Among them, "the Gate of Ice and Snow" had been widely used by the International League To conquer Communism as anticommunist and anti-USSR propaganda. It was again taken out of storage to be used.

As "A Policy Series To Contemplate Japan's Future Course," a total of five pamphlets--(1) "The Northern Defense That Is Threatened"; (2) "The Middle East--Japan's Lifeline"; (3) "White Paper on the Self Defense Forces"; (4) "Now, Let's Reexamine the Constitution"; and (5) "White Paper on Education"--were prepared.

Prefectural citizens councils have already been organized and started activities in more than 40 prefectures. Offices of liaison offices of those councils are in almost all cases placed in local branches of Siecho-no-ie or the Central Agency for Shrines. The policies of their movement are almost the same as those of the center and have no characteristic of their own. In Kyoto, however, the prefectural citiznes council is named "The Kyoto National Council To Love Japan." As a movement of its own, its goal is "to restore the old Imperial House Act and hold a coronation in Kyoto." The Kyoto Prefectural Assembly has already adopted a resolution to petition on behalf of this objective.

As for "local assembly resolutions to promote peace and security," an important goal for 1982, a model was written at the center and detailed notes and instructions on procedures were given to each prefectural citizens council. On 23 December, a greatly amended draft resolution was adopted at the monthly general assembly in Yabe, Kamimashiki District, Kumamoto Prefecture. Previously, a resolution had been introduced in the Hino City Assembly of metropolitan Tokyo, but it was blocked in the end. Consequently, the resolution in Yabe became the first to be passed in the country.

"The Yabe Citizens Council To Protect Japanese Tradition" that petitioned for the resolution is a local organization of "The National Council To Protect Japan." Although many citizens councils are organized at prefectural level, those at the city, town, and village levels are organized in only 14 cities, towns, and villages of Kumamoto and Miyazaki. These two prefectures are, so to speak, model regions. The National Council's eagerness to adopt this resolution was great. It sent a group of organizers led by Masakuni Murakami, vice chairman f Seicho-no-ie, to Yabe. A large-scale propaganda campaign was carried out, including an all-household signature collection campaign. As a result, the resolution was adopted by a 13 (including one Komei Party vote) to 1 margin (one Communist Party member and one Socialist Party member boycotted the vote).

Making the case of Yabe a breakthrough, this type of resolution will be presented to every local assembly this year. With this achievement as background, the National Council intends to make the upcoming 1983 general election a political battle over the issues of constitutional revision and defense and bring together all constitutional revision factions.

.A Model Resolution Written by the National Council

To: The Prime Minister

The Speaker of the House of Representatives
The Speaker of the House of Councilors

Statement Concerning the Self Defense Forces for the Purpose of Portecting Peace and Security

Recently, the international environment surrounding our country has become drastically more severe, and people's interest in peace and security has been rising greatly.

However, the conflict of opinion over the existence of the Self Defense Forces, the basis for national defense, still continues between powerful parties. For this reason, the Self Defense Forces have many problems.

Specifically:

Item: The current defense structure has various legislative defects which prevent the Self Defense Forces from demonstrating their fighting power.

Item: Self Defense officials are unfairly discriminated against in various matters such as public recruiting activities, participation in public events such as national athletic meets, and admission to national universities.

Item: The Self Defense Forces are very unfairly treated in school curriculums, beginning with their description in school textbooks.

Therefore, we strongly request that, in order to establish our country's peace and security, the government and the Diet clarify the status of the Self Defense Forces and try to correct the previously mentioned points immediately.

.The Resolution Adopted in Yabe, Kumamoto Prefecture, on 23 December

To: The Prime Minister
The Speaker of the House of Representatives
The Speaker of the House of Councilors

Statement Concerning the Self Defense Forces for the Purpose of Protecting the Peace and Security of the Country and Homeland

In reviewing the present defense structure of our country, the Self Defense Forces possess various legislative deficiencies.

Therefore, in order to protect the peace of the homeland and the security of the people, the government should immediately try to correct the legislative defects while respecting the constitution's spirit of loving peace.

Based on item 2, Article 99 of the Local Government Act, we present this statement of opinion.

Take in the Middle-of-the-Road Forces!

The model of "lcoal assembly resolutions to promote peace and security" does not refer to constitutional revision (undesirable revisions) at all. If you read it through, however, it is quite obvious that the goal is to revise Article 9 of the constitution. In other words, instead of requesting constitutional revision in a straightforward manner, it intends to open a road toward constitutional revision by approaching it through the backdoor. Why do they need this sort of detour? One reason is consideration for public opinion. More important, however, is the local assembly resolution movement's goal of taking in middle-of-the-road forces which have not yet made clear their position on constitutional revision.

According to an internal document for discussion of the National Council entitled "Stir Up Local Energy--the Prospects of the Movement for Local Assembly Resolutions on the Self Defense Forces," the local assembly resolution movement has three goals.

1. In the local assembly resolution movement, we will try to consolidate further the policies of the middle-of-the-road parties which have been asserting more realistic policies on the defense issue, and thereby draw a clear line between them and the Socialist and Communist Parties, which make dissolution of the Self Defense Forces party policy.

2. In doing this, we will try to make it clear to society that the policies of the Socialist and Communist Parties, which make dossolution of the Self Defense Forces party policy, are contrary to the views of the 80 percent of the nation that approves the Self Defense Forces. We will try to isolate the Socialist and Communist Parties, which advocate the equation of protection of the constitution with opposition to defense, and thereby inflict decisive damage on those parties.

3. We will try to firm up the coalition of conservative and the middle-of-the-road parties in order to form a majority that more strongly promotes the constitutional revision movement.

This line of abosrbing middle-of-the-road forces into the constitutional revision factions runs through all of "Stir Up Local Energy," a written program for constitutional revision by the National Council. "Sitr Up Local Energy" describes the preconditions for constitutional revision as follows. Concerning the number of Diet seats required for constitutional revision (more than two0thirds in both houses), it says that "it is not possible for the LDP to occupy two-thirds by itself in the future." On the other hand, it guesses that the Socialist and Communist Parties and the Socialist Democratic League cannot get the one-third of the seats necessary to prevent constitutional revision either.

If so, "the middle-of-the-road Komei Party, Democratic Socialist Party and New Liberal Club will hold decisive votes." The trend of the Komei Party in particular becomes very important. Furthermore, as an extension of this recognition, it states that "considering the protect-the-constitution faction within the LDP and the approve-the-Self-Defense-Forces faction in the Socialist Party, many--including those who object to constitutional revision--can agree on the defense issue even though they may not agree on the constitutional issue." The analysis is as follows: "The present political situation is one in which a state of confrontation exists between the defense bloc consisting of the LDP and Democratic Socialist Party and

Communist Parties. Between the two, the Komei Party is swinging. If the defense bloc is strengthened, it will divide the protect-the-constitution forces of the Socialist and Communist Parties into many camps. Thus, it may be possible to limit the protect-the-constitution forces to less than the one-third required to prevent the constitutional revision in the future. On the other hand, if the whole body of Komei Party members joins the defense bloc, it is a step toward formation of the two-thirds majority required for constitutional revision in the future." "The defense bloc" versus "the protect-the-constitution bloc" is an expression that describes the situation very well.

Moreover, according to the same document, the National Council assumes the 1983 general election will be "the first stage of a shift from the defense to the constitutional revision issue." If the constitutional revision faction can win overwhelmingly in the election, it will rush into the second stage in which work on constitutional revision itself is started. "The main point of the movement during the second stage is to write a draft revised constitution that clearly presents to people our policy of constitutional revision when debate occurs over changes in interpreting the constitution or line-by-line revision of the constitution. In this way the revision faction will obtain the support of the public for the solution of constitutional problems. Furthermore, by determining a definite direction for constitutional revision, we will achieve organization of a nonpartisan Diet members' union for constitutional revision by uniting four parties" [the LDP, the New Liberal Club, the Democratic Socialist Party, and the Komei Party]. By doing so, they intend to realize the constitutional revision at one stroke in the second stage. To do this, it is necessary to gather a broader spectrum of people than in the case of era name legislation. The need to call on labor organizations, educational circles, young people, and women to form a truly comprehensive national union is emphasized.

I have quoted a rather long passage. Under present conditions in which rightwing reactionary tendencies have been progressing at a high pitch, their aggressive "constitutional revision plan" cannot be laughed at as a wild story or fabrication. The strategic point in the frist stage of their constitutional revision approach is to try to get middle-of-the-road forces on their side. They have succeeded to a considerable extent, particularly in winning over the Komei Party.

The Komei Party, which has been shaken by scandals in the Soka Gakkai, its parent organization, intends to take a step further to the right on defense and security issues. At the party convention held on 1-3 December last year, it clearly expressed its posture of approving the Japan-U.S. Security Treaty and accepting the Self Defense Forces even though various restrictions and conditions were attached. The Komei Party called it a realistic line. The party literally joined the defense bloc.

The Democratic Socialist Party is no problem since nowadays it is said to be further right than the LDP. In addition, the Japan confederation of Labor, the Democratic Socialist Party's powerful support organization, has listed support for increased defense capability among its policies for 1972-73 [as published] activities. This is the first time that strengthening the Self Defense Forces has been clearly stated among the policies of the national center. Moreover, names of leading members of labor unions belonging to the Japan Confederation of Labor, which did not appear in the movement for era name legislation, appear among the supporters of prefectural citizens councils in places like Osaka.

It should also be noted that Ichiro Shioji, president of the Automobile Workers Union, is one of the supporters of the "Showa History Study Association" which is closely related to the National Council To Protect Japan. The purpose of this association is "to clarify the truth about the Greater East Asia War, the Tokyo Trials, and a series of occupation policies that were the origin of Japan's postwar era through study and research of Showa history." With Hisao Ito, the campaign manager of former Chief Of Joint Staff Hiroomi Kurusu's campaign for the House of Councilors, as the central figure, well-known rightwing intellectuals such as Seizo Arisue (honorary president of the Japan Reservists Friendship Association), Ikutaro Shimizu, Niaranosuke Nakoshi (assistant professor of Takachiho Commerce College and one of those who started attacks on Red school testbooks), and Jun Eto became supporters of the "Showa HIstory Study Association." The first pamphlet it published was "Prejudiced School Textbooks That Scare" (written by Takushoku University lecturer Masaaki Tanaka). The second one was "Thinking About the Current Constitution" (written by Aoyama Gakuin University Professor Kazuo Sato). If you look at these pamphlets, you can easily guess what sort of organization it is. (Professor Sato is the only professor in the country who makes an introduction to military life program offered by the Self Defense Forces a prerequisite for students wishing to take his course.) Incidentally, an office of the Japan Education Student Union, an organization funded by big business aimed at organizing anti-Japan Teachers' Union groups, was located in the office of the Showa History Study Association until last summer. A powerful Socialist Party Diet member is also connected with this Japan Education Student Union.

As is well known, President Ichiro Shioji of the Japan Automobile Workers Union is a leader in the movement for labor unification under the leadership of private sector workers. In the secret minutes of a meeting to promote a united front, Shioji and Nakamura, president of the Federation of Iron and Steel Industry Workers Union, made remarks which could be interpreted as support for constitutional revision. This fact cannot be ignored.

From Partial Revision to Complete Revision

Along with the strategy to take in middle-of-the-road forces, the composition of a specific ervised draft of the constitution has been progressing steadily. The LDP's Constitution Research Committee (chairman, Mitsuo Setoyama) called 1982 "the year of the constitution." It established a summarization subcommittee in May of last year to write a specific revised draft of the constitution. Moreover, it set up for workshops within the subcommittee this January to discuss each draft of the preamble and other articles. Each workshop is supposed to complete a draft by summer. It plans to present the drafts to the LDP's Executive Committee prior to submission to the Policy Affairs Research Committee and to schedule discussion of the drafts at the party convention within 1982.

Prior to the LDP's Constitution Research Committee, the "Diet Members' Union To Realize an Autonomous Constitution," that is in a relationship like that of participants in a three-legged race with the "National Council To Protect Japan," completed "An Outline of a Draft for Revision of the Constitution" on 21 October last year.

The outline suggests revision of 10 articles, including Article 1 (status of the emperor), Article 9 (renouncement of war), and Article 41 (legislative powers). The principal aims of the revisions are: (1) to state clearly that the emepror is the head of state; (2) to make the Self Defense Forces constitutional and enable them to use arms; (3) to change the statement that the Diet is the highest organ of state power to "the people's representative body"; and (4) to change the sentence "a resolution of nonconfidence in the cabinet should be decided by a majority of Diet members present" to "a resolution of nonconfidence in the cabinet should be decided by a majority of all Diet members.

This published draft of proposed revisions does not include the "restriction of basic human rights" or the "establishment of emergency supreme power," which the constitutional revision faction has been putting forward for years. The draft is toned down considerably. There is, however, a backside to it. Assistant Professor Mitsunori Takebana of Komazawa University actually wrote the draft. Although he is not known among constitutional scholars, he is related for one reason or another to the Diet Members' Union To Realize an Autonomous Constitution.

In the secret leaflet entitled "The First-Stage Draft and Draft Legislation for Revision of the Constitution," Assistant Professor Takebana explains: "In the current situation, a complete revision of the constitution is actually impossible." Therefore, he recommends that they try to accumulate "partial revisions." In the first stage of the revision, he says that "we would limit our objective for revision to those provisions which have a relatively strong technical nature and have a necessity easily understood by the general public."

For example, the draft revisions of Article 9 are as follows: Draft 1. Insert a third paragraph: "The preceding paragraph is intended to defend the independence and security of Japan and to protect the basic human rights of the people. It does not prevent the possession of the necessary power (or armed power) and its application."

Draft 2. Eliminate item 2 and add "The armed power possessed by Japan is intended to defend the independence and security of Japan and to protect the basic human rights of the people."

He explains the point of the revision as follows. "It is necessary to make revisions such that the Self Defense Forces are clearly constitutional. However, it is desirable not to touch directly the current constitution's principle of pacifism."

Everything is explained in this manner. The first-stage draft does not refer to the preamble of the constitution because of this "thoughtfulness." "The preamble states the basic principles of the constitution. If we change the preamble, it gives the impression that we are changing the basic principles of the constitution and invites strong repulsion from the protect-the-constitution faction. The result might be to put a brake on the revision procedure.... If the situation were such that complete revision was possible, it would be different. In the present situation, where people's allergic reaction to constitutional revision is still strong, revision of the preamble is better postponed until after the second-stage revisions."

The previously presented draft constitutional revisions mostly suggested drastic changes in the basic principles of the present constitution. In those cases, ideals took precedence. The draft of the first-stage constitutional revision written by the Diet Members' Union To Realize an Autonomous Constitution, however, suggests partial revisions. It is, so to speak, a method in which real profit takes precedence.

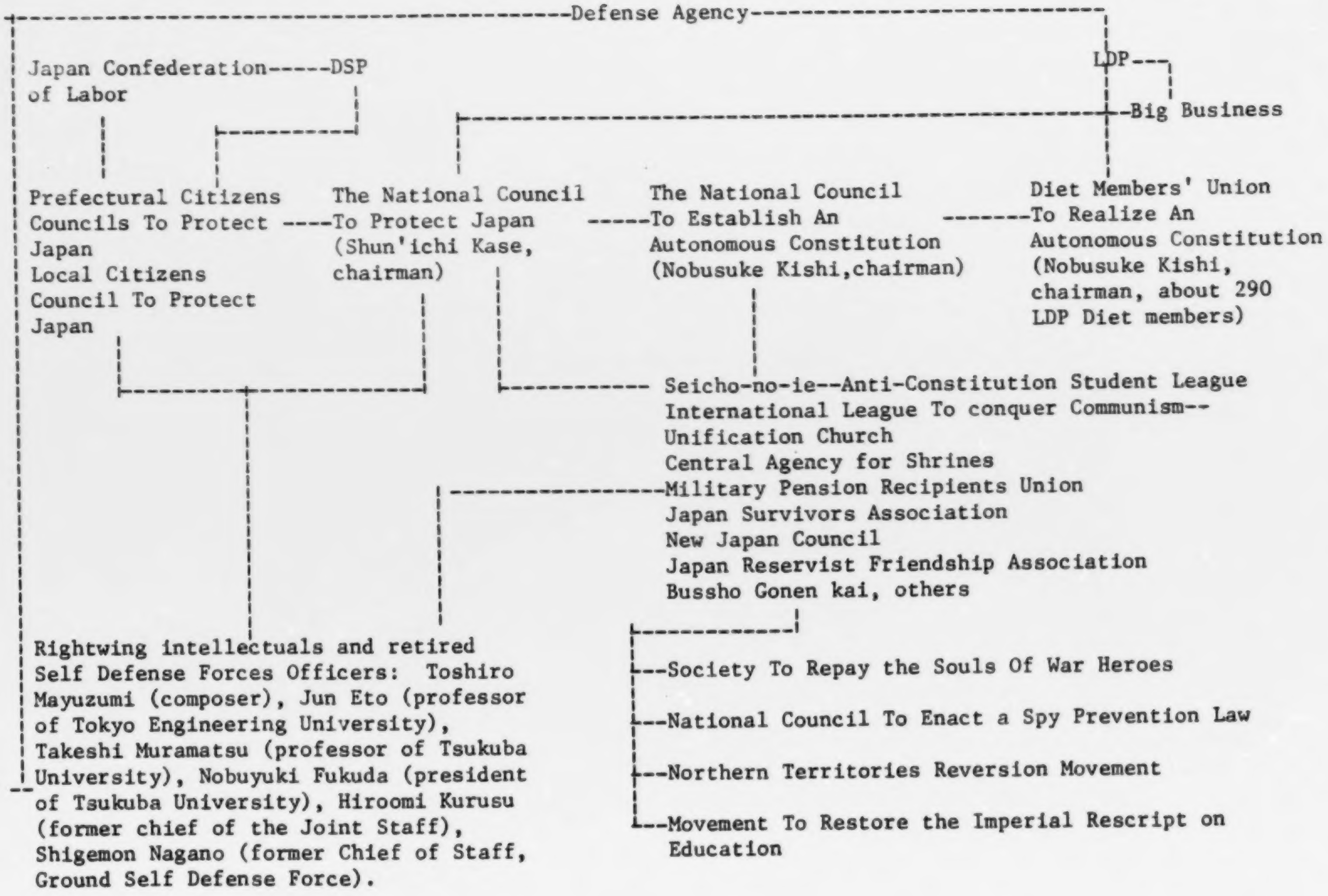
In other words, it is an extension of a theory calling for changes in the interpretation of the constitution and its gradual revision. This kind of revision is suggested today because, as the constitutional revision faction admits, the current constitution has undeniably been widely planted and "half established" in Japan (the National Council, "To Raise a National Movement"). That is why a detour strategy of accumulating partial revisions is necessary in order to realize constit tional revision. And isn't this evidence that the constitutional revision faction has judged that the opportunity has come?

The Encircling Net of Constitutional Revision That Has Become Narrow

Constitutional revision versus protection of the constitution, and maintenance of the Japan-U.S. Security Treaty versus renouncement of the Japan-U.S. Security Treaty, have been the basic patterns of confrontation in postwar Japanese politics. Recently, however, this pattern of confrontation has been shaken greatly. The final goal of the constitutional revision faction is "to establish a new constitution and to renew the age." Two years ago last March, the Diet Members' Union To Realize an Autonomous Constitution asked the LDP's local organization in each local assembly to petition for adoption of a resolution "to establish a new constitution and to renew the age."

The results were miserable. The resolution was adopted by only 15 or 16 local assemblies, including Beppu in Oita Prefecture, Aida in Okayama Prefecture, and Monzen in Miyazaki Prefecture. Then, they came up with "a big detour strategy" and the "national movement" line.

Constitutional Revision Forces


Defense Agency
Japan Confederation of Labor
DSP
LDP
Big Business
Prefectural Citizens Councils To Protect Japan
Local Citizens Council To Protect Japan
The National Council To Protect Japan (Shun'ichi Kase, chairman)
The National Council To Establish An Autonomous Constitution (Nobusuke Kishi,chairman)
Diet Members' Union To Realize An Autonomous Constitution (Nobusuke Kishi, chairman, about 290 LDP Diet members)
Seicho-no-ie--Anti-Constitution Student League
International League To conquer Communism--
Unification Church
Central Agency for Shrines
Military Pension Recipients Union
Japan Survivors Association
New Japan Council
Japan Reservist Friendship Association
Bussho Gonen kai, others
Rightwing intellectuals and retired Self Defense Forces Officers: Toshiro Mayuzumi (composer), Jun Eto (professor of Tokyo Engineering University), Takeshi Muramatsu (professor of Tsukuba University), Nobuyuki Fukuda (president of Tsukuba University), Hiroomi Kurusu (former chief of the Joint Staff), Shigemon Nagano (former Chief of Staff, Ground Self Defense Force).
Society To Repay the Souls Of War Heroes
National Council To Enact a Spy Prevention Law
Northern Territories Reversion Movement
Movement To Restore the Imperial Rescript on Education

Currently, many reactionary resolutions are bunched in local assemblies such as "Official Visits to Yasukuni Shrine," "Enactment of a Spy Prevention Law," and "Revision of the Basic Education Law." The resolution to promote "Official Visits to Yasukuni Shrine" has been promoted by "The Association To Repay the Souls of War Heroes" (former Public Prosecutor General Masumoto, chairman). The resolution had been adopted in 35 prefectural assemblies and 1,240 local assemblies by the end of 1981. A resolution to oppose official visits to Yasukuni Shrine was adopted in Okinawa Prefecture; metropolitan Tokyo's Shinjuku Ward, Nerima Ward, and Higashimurayama City; and Niihama City in Wakayama Prefecture.

A resolution to promote "Enactment of a Spy Prevention Law," promoted by the International League To Conquer Communism, had been adopted by 14 prefectural assemblies and approximately 500 local assemblies by the end of the summer of 1981. In October 1980, a resolution to revise the Basic Education Law was forced through in Gifu Prefecture. With the "national movement" called the local assembly resolution movement in the background, attempts to revise the basic laws which have sustained the postwar constitution have been progressing rapidly.

A new fact of the rightwing called "The People's Committee of ONe Hundred To Request Revision of the Japan-U.S. Security Treaty" was organized last March. Its members are almost same as the officers and supporters of the National Council To Protect Japan (the chairman is Shun'ichi Kase, who is also chairman of the National Council). The People's Committee of One Hundred intends to expand into The People's Committee of ONe Thousand some day. Hereafter, such people's committees of one hundred and one thousand will be created one after another.

The organization of the "National Council To Protect Japan" is at the top of the rightwing national movements. Serious grassroots movements are not the monopoly of the leftwing. Originally, the strategy of the conservatives was expressed in the term "silent majority." The antiwar and prevent-constitutional-revision movements have been getting somewhat stale and devoid of meaning. Now, however, is not the time to ignore the true value of these movements.

9896
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POLITICAL AND SOCIOLOGICAL

KISHI'S ROLE IN LDP POLITICS DISCUSSED

Tokyo SENTAKU in Japanese June 82 pp 50-53

[Text] The political situation has become chaotic. It seemed that if the Diet brought down the curtain, the big disturbance would be over by early Fall, even if there were some difficulties. However, with the super-long 94-day extension of the session, it is doubtful that the situation will turn around. Until 21 August we will have literally a "Midsummer Diet," and what will happen therein? The atmosphere is getting oppressive already.

Chairman Sasaki of the Democratic Socialist Party, which is called the weathercock party, mutters that, "When people ask me if there will be a Cabinet collapse, frankly, I cannot predict. However, the session became so long that anything can happen, and this is unusual." As he says, we have fallen into extreme political apprehensiveness with an unknown future. It goes without saying that the central matter of concern is the fate of the Suzuki cabinet. Just like a boat being tossed about in rough seas, the symptoms of the drifting government are becoming acuter as time goes by. The extension was not originally in Suzuki's mind; he had planned to close the session a little early, and set out on foreign travel on 3 June, after being relieved of his responsibility. However, since he was cast in the scenario that former Prime Minister Tanaka had high-handedly created, Suzuki's presence in managing politics can be felt even dimmer than ever before.

When Chief Cabinet Secretary Miyazawa recently heard it said that perhaps Suzuki is Tanaka's robot, he made a resigned response, saying "Nothing new about it." With the theory surfacing that Suzuki will retire, Miyazawa, who is one of the "next" candidates, appears to be thinking that it is not wise to oppose those in the party who wish to move away from Suzuki, or to adopt a further role of breakwater for Suzuki's defense. The word of Miyazawa, who is a thorough-going rationalist, ended up saying that the Suzuki cabinet is weakening beyond imagination.

Instructions to the Fukuda Faction To Overthrow the Cabinet

Nevertheless, the concerned voice that "Kishi seems to be the most unbending" is rapidly spreading around Suzuki. Former Prime Minister Kishi has volunteered to be the champion of the retirement theory. When the [Suzuki] cabinet was formed, Kishi was making statements sympathetic to Suzuki, such as "He has always been a helpmate; it [the premiership] just fell on his lap; he never went after it. He is a layman at diplomacy, and will have a hard time."

However, recently Kishi has become increasingly severe, and started to clearly demand [Suzuki's] retirement by saying, "He became prime minister by default, so he must retire now." He is even blasting his favorite apprentice, former Prime Minister Fukuda, saying, "What is most lacking in politics now is determination. There is no daring decision made on the basis of good political sense. Everything is done as a makeshift. Pretty soon, it will run into a wall. He must be forced to retire soon. Otherwise, you will regret it." Thus, he is urging Fukuda and his followers to bring down the cabinet.

Because this kind of report drifted about, Suzuki was extremely concerned about the meeting of the supreme advisors of the LDP set for 21 May, prior to his foreign travel. There are five advisors at present: former Prime Ministers Fukuda and Miki, former Chairman of the House of Representatives Nadao, former Speaker of the House of Councilors Yasui, and Kishi, who, although not a member, was reinstated after the revision of the party rules in January. They are all senior members who are critical of the Suzuki system which Tanaka supports, and only Kishi was expected to act as a brake when criticism emerged around Suzuki, because "recently he became so close to Kaku that they can speak frankly with each other." Now that [Kishi] is turning to the retirement theory, he cannot help but get nervous. If it was Kishi who broached the foreign travel idea saying, "It would be for your own good if you thought about your own future after returning from the foreign travel," the fire would start at once.

However, at the meeting, while Miki suggested that, "in a time like this, (at the end of foreign travel), it would be better to return early, without stopping in Brazil and Peru," Kishi only made one suggestion: "What is happening with economic cooperation with South Korea? It is not good to prolong the decision; it would be better to decide soon." Suzuki explained to Kishi that, "I indicated Japan's sincere proposal, but because of the other country's domestic situation, it would be better to wait a while. I am not forgetting it; I think it is an important issue." He left in the middle of the next discourse because of previous engagements, but he seemed worried about the remaining [session]. Because, the first thing he asked the press corps after returning to his official residence was: "How was the meeting? It lasted a long time, didn't it." The result was that, although it ended in an atmosphere like that of a farewell party for his departure to the Versailles Summit, for Suzuki it was like walking on thin ice.

A "Secret Pact" With Tanaka

Kishi's intentions are not really clear. When his 85th birthday party was held on 14 November last year at Kishi's mansion in Gotenba, Shizuoka Prefecture, Kishi expressed his well-seasoned mind before about 300 politicians who streamed in from Tokyo, saying, "I will no longer participate in raw political games. I would like to deal with somewhat more important issues. Domestically, our basis is the establishment of an independent constitution, and in foreign relations it is the strengthening of Japanese-U.S. relations. As chairman of the Japan-U.S. Association, I would like to promote this." Tanaka was the only one who did not show up. He apologized the night before, by phone, saying, "If I came, it would make things suspicious. I am sorry if it appeared disobliging." Ironically, the fact that they both were concerned about "suspicion" gave a very suspicious impression. Moreover, when Kishi was surrounded by the press corps before the opening banquet of the party, he straightened himself up and said, "I am well advanced in years, but I will still run with the young people's ways." As he said, Kishi set out to stir up political troubles behind the political world. However, looking into the party, no obvious successor to Suzuki can be readily found. Who will be Suzuki's successor in Kishi's mind? At the time of the 40-day dispute in the fall of 1979 when Ohira (who was prime minister at the time) and Fukuda staged a life and death struggle, Kishi kept in close contact with Tanaka, and after calling in Fukuda, made an enthusiastic speech supporting Miyazawa, saying, "How would it be if you, Ohira, and of course Miki all retired if things are going like this? And, it is youwho should talk Ohira into it. It would be all right to have Miyazawa (Kiichi) [as prime minister], or Kamoto Toshio if he does not work out. Abe (Shintaro), Takeshita (Minoru), and Nakagawa (Ichiro) are still not good. Age-wise, they are all right, but they are not mentally prepared. It would be good to train these men in the next 2 or 3 years by having them serve as chief secretary or finance minister while Miyazawa is serving [as prime minister]. Miyazawa is sharp, and if everyone around him helped, he could do it."

In this occasion, however, the dispute settled a bit later, Fukuda was not able to persuade Ohira, and when Kishi revealed that, "It probably would be difficult for Miyazawa [to become the prime minister] since opposition appears to be emerging within the party." Nevertheless, it was clear that he clung to Miyazawa. Not only was Ohira Fukuda's rival therefore unacceptable to Kishi, but also Kishi had strong misgivings about Ohira's pro-PRC posture. Nevertheless, if [the Cabinet] were to be brought down during the term of office, it would be easy to restore the party with the Ohira faction filling in. At that time, Suzuki was not in Kishi's eye. Kishi highly recommended Miyazawa, who was one of the bureaucratic elites and cautious in his posture toward the PRC.

More than 2-1/2 years later, the situation had changed considerably because Suzuki got in during that time. Other factions would not allow Ohira, Suzuki, and Miyazawa, who are of one faction, (Koikekai) to consecutively take charge of the government. Miyazawa's chance is slim, and perhaps he is thinking of Komoto, the other Kishi mentioned.

The key is what kind of consultations are going on between Kishi and Tanaka. It does not seem that the Suzuki retirement theory of Kishi is contrary to Tanaka's wishes. Kishi's contact with Tanaka has been frequent, and lately he has recognized Tanaka's ability as "kingmaker," saying, "Tanaka is an interesting person who has charm. There are not many guys as interesting as he is. He created the largest faction since the beginning of the LDP, and if we ignored the Tanaka faction, we could not come to power. Who will become prime minister will depend on the cooperation of the Tanaka faction." In other words, while talking about Suzuki's early retirement, Kishi is not trying to hide the fact that Suzuki's successor is left to Tanaka's wishes.

"Tanaka Also Abandoned Suzuki"

Soon there will be a point where a political forecast can be made under the new situation, namely the long extension of the session. At the celebration of Kishi's inauguration as an LDP supreme advisor, which was held at the "Shinkiraku" restaurant in Tsukiji, Tokyo, on 17 March, Tanaka first spoke about his theory of revising the constitution. "What was created under occupation by another country cannot be called a constitution. Revision of the constitution is considered taboo, but doesn't our party platform mention the establishment of an autonomous constitution?..."

This showy statement was taken as questionable within the party. The leaders of the Suzuki faction explained it, saying, "Perhaps it is a gesture to Kishi, who is devoting his remaining years to revising the constitution. Well, he is an apple polisher. In actuality, neither Kishi nor Tanaka is thinking of realizing a revision of the constitution. Tanaka's goal is to put his efforts in line with Kishi's." However, the only way to interpret it is that Tanaka has been building a strategy of a long extension of the Diet session, which is to be followed by a tension in political situation, and then finally to be resolved in the main breakthrough.

What appears to be Tanaka's real intention surfaced on the night of 21 May, the same day the supreme advisors' meeting was held, in which Chairman of the LDP's Policy Board Tanaka Rokutske and members of the Suzuki faction who has been elected three or four times had a long talk. At this meeting, Tanaka first mentioned the time of [Suzuki's probable] retirement. "I do not know how long the Suzuki government will continue, but we will be reelected. This is certain. However, [he] may retire (as prime minister) in the fall of next year." While saying this, he half-jokingly said, "The general election probably will be held along with next year s House of Councilors election. Voter turnout will rise 20 percent, and the prime minister will be so happy with the great victory that he will nearly drop dead." This statement is significant, and its beauty is that it contains a serious contradiction.

If, as Tanaka says, Suzuki is relected, and there is a big victory in the election of both Houses of the Diet next summer, under Suzuki, the Suzuki system will naturally be consolidated. There is no reason why he should retire that fall. In spite of this, why did Tanaka mention the "fall retirement?"

There are two possible hypotheses regarding Tanaka's scenario. The first would be one in which the Tanaka faction would tentatively aim to reelect Tanaka after venturing a frontal breakthrough by the long extension. However, if the situation were to become insurmountable, it may be obliged to accept a change in government. Therefore, the principle is reelection, but he also has [Suzuki's] retirement in mind when he mentioned "the fall retirement." It is unusual that the forces supporting reelection are talking about [Suzuki's] "retirement" at this time, and although it is impossible to avoid the emergence of a voice within the party that, "Tanaka abandoned Suzuki," he took this into his calculation when he made his scenario.

The second scenario would be as follows: [Suzuki] is reelected, and there is a great victory in the election; but the first conviction in the Lockheed trial would come out against Tanaka about that time; the shock of the conviction would be great even with the secure majority of the LDP; and eventually it would be necessary to ease the shock by changing the government.

Tanaka's strategy is probably the former. Due to the long extension, the sentencing of the defendants of the JAL routes in the Lockheed trial, which is scheduled on 8 June, will be carried out during the session. However, if he can somehow get through that, and finish up pending issues such as the reorganization of the House of Councilors districts, he could get away with not holding the fall extraordinary session of the Diet. Tanaka thinks that, if that happens, the Diet will be in recess at the time of the prosecution's final speech to Tanaka, which is expected sometime after the fall, and he could hold the impact of the prosecution to a minimum. It is for this reason, according to the belief of political circles, that he has directed the extension to Secretary General of the party Nikaido. However, due to the policy of forcing this frontal breakthrough, the Suzuki cabinet is hurt all over, and it may collapse. While taking this into account and doing his best to avoid confusion, Tanaka will have to decide on a "successor" under his leadership.

The "Abe Government" He [Kishi] Would Like To See--the Sooner, the Better

Although dangerous, it is all right to think that Tanaka expects Kishi to play the role of rotating the stage when it comes to a change in government.

This is because the only way to select a successor by the agreement of the three large factions, "Suzuki, Kaku, and Fukada," without aggravating the "Kaku-Fuku" conflict, just as at the time of Suzuki cabinet's birth, would be to restrain Fukuda and to get the support of Kishi, who still has an influence over Fukuda. Talks between Tanaka and Kishi have already been concluded. Kishi has a hand in the scenario, and there is a speculation that Suzuki's retirement is being worked out early. Even regarding Tanaka, Kishi has not forgotten to ask self-restraint, such as, "Since he is implicated in the Lockheed case, and it is not a party member, Tanaka himself cannot consider directly assuming government. Nor can we allow someone who is clearly his substitute within the party to take power." However, possibly because of the retirement theory, they all sound as if they are speaking for Fukuda's thinking. If Kishi opens fire and waves the flag, and if Suzuki, as a result, retires, Kishi's influence over Fukuda and the others will increase. It can be viewed that Kishi is bearing one of Tanaka's two postures.

However, it is not known whether Kishi and Tanaka agree on who to make "successor." The successor will have to be chosen among Nakasone, Komoto, Miyazawa, and Fukuda, but, as mentioned before, Kishi leans toward Miyazawa and Komoto, but Tanaka is said to be sympathetic to Nakasone, so it appears it will not be easy to coordinate this.

In any rate, it is monstrous that the aged Kishi, who has already retired as a Dietmember, is occupying the center stage of the political game. It is certain that Kishi is lending a hand in Tonaka's strategy, but it could also be called a good chance to obligate Tanaka. This is probably linked to a way to fulfill his desire, as father-in-law, to see the "Abe government" as soon as possible. However, it would be normal for the political world if this did not progress as scheduled. An intricate political situation comparable to a hard-to-solve mathematical factor is deepening.

9991
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ENERGY SECURITY, MARINE TRANSPORTATION POLICIES DISCUSSED

Energy Fleet Construction

Tokyo ENERUGI FORAMU in Japanese May 82 pp 111-113

[Article by Hiroshi Nagai, director of Shipping Bureau, Ministry of Transport: "New Development in Energy Security and Marine Administration"]

[Text] What are the Conditions for the Establishment of an Energy Fleet?

Energy Security Guarantee and Japanese Ships

Japan is not blessed with natural resources. In particular the self-sufficiency rate in energy resources such as oil, LPG, LNG and coal is very low, so Japan among all the advanced nations depends most on imports for its energy supply. In addition, being surrounded by the sea on all sides, to be able to insure stable transportation of these energy resources by sea is an extremely important matter with regard to securing the energy resources and guaranteeing Japan's economic security.

Oceangoing marine transporation plays a very important role for Japan, whose survival depends on trade not only in the area of energy but also in importing important raw materials and exporting industrial products.

Japan's marine transportation goods are carried by Japanese ships, chartered foreign ships manned by crews from developing nations, so Japan's shipping industry has come to rely more and more on chartered foreign ships. As shown in Table 2, the number of Japanese ships peaked in 1973 and the tonnage in 1976, and both are on the decline.

However, securing oceangoing Japanese ships is very important for guaranteeing Japan's economic security, including energy security. That is to say, if a conflict should occur involving the country in which the chartered ship is registered, the ship might be drafted by the country of its registry, or if the country happened to be the homeland of a crew, the crew might be drafted by the country, or the crew might leave.

Moreover, there is also the danger of being unable to procure the necessary ships due to a worldwide shortage of available ships resulting from the charter of a large number of ships by the countries involved in the conflict and the detours necessitated by the blockade of canals and straits or to avoid the danger zone. Or, even if the ships are available, Japan might have to pay very expensive fees.

Furthermore, if Japan itself became the danger zone, the use of foreign ships might become impossible for a number of reasons, including denial of port call to foreign ships, denial of continued use of chartered ships, or the departure of the crew.

Therefore, it is very dangerous for Japan, which depends on the overseas supply of most energy resources and other important materials, to rely too heavily on foreign ships. We must always maintain a fixed number of Japanese ships manned by a Japanese crew to the extent that economic chaos will not result in time of emergency.

Another important point about the use of Japanese ships today concerns the stable transportation of oil substitute energy. One of the important topics related to guaranteeing Japan's energy security at this time is the tranformation of the energy structure through promoting the introduction of oil substitute energy. The success of this project depends heavily on a stable supply of oil substitute energy.

In regard to the supply of oil substitute energy, the development of energy in the source country and the establishment of an introduction system in Japan are equally important, and it is indispensable that stable transportation be maintained between the source country and Japan. For the purpose of maintaining stable transportation, the availability of Japanese ships which are suitable for the development and introduction of the system under any circumstances, during an ordinary period or an emergency, is of great significance.

Needless to say, it is important to be able to continue to maintain stable transportation of oil, which still fills the greater part of the energy needs of Japan. But the most important role that is expected to be played by Japanese ships today is to maintain stable transportation of oil substitute energy such as LNG and coal.

The present status and the future needs of Japanese ships for the transportation of coal and LNG as oil substitute energy will be described next.

1. Coal

In 1980, Japan's overseas coal imports amounted approximately 73 million tons (7.2 million tons of which were ordinary coal), and the loading ratio of Japanese ships was approximately 43 percent of the total imported overseas coal. Approximately 72 percent of the volume of traffic carried by Japanese ships involved special ships.

The type of transportation contract involving special ships is mainly the long-term guaranteed cargo contract in which a specific ship is assigned to a specific route to transport guaranteed cargo over an extended period of time.

The tonnage of Japanese ships that will be needed in the late 1980's for the transportation of overseas ordinary coal is expected to be on the order of 1.9 million tons, based on the assumption that the volume of imports is on the order of 60 million tons and the loading ratio is on the order of 40 percent, which is the loading ratio of overseas transportation today. The necessary tonnage can be expected to exceed this figure in order to guarantee stable transportation.

In regard to the type of ship, basically, large special ships are desirable from the viewpoint of lowering the transportation cost. However, the choice of the type of ship is also dependent on the restrictions imposed by harbor conditions, the size of cargo, and the transportation distance. It is necessary to handle this matter with flexibility, taking into consideration these concrete navigational factors.

2. LNG

Japan's 1980 LNG import was 16.79 million tons. It was all transported by foreign ships; not a single Japanese ship was engaged. Only a few Japanese LNG ships have begun to be built in the past year or so. In view of the importance of securing LNG resources, we must continue to consolidate our position aggressively so that a portion of the LNG transportation task will be undertaken by Japanese ships in the future.

Plans for Consolidating the Position of Japanese Ships

In order to consolidate the position of Japanese ships, we must first create conditions which will favor the selection of Japanese ships and establish a framework for the stable construction of these ships. The following measures appear to be necessary for this purpose.

1. Consolidating Conditions Which Favor the Selection of Japanese Ships

For Japanese ships to be selected, various related expenses must be reduced so as to restore their international competitive edge against foreign ships manned by crews from developing nations. To accomplish this, the shipping industry must reevaluate the complement through labor-management cooperation in order to save expenditure on the crew and to strive for reduction of the cost of operation by all means, including energy conservation measures.

Assuming that industry will carry its share of the burden, the government must implement measures to lower the amount of shipbuilding capital required.

2. Establish a Framework for Stable Construction of Ships

In order to realize stable construction of Japanese ships, the operational base of the shipping industry must be strengthened and the funds needed for construction of Japanese ships must be secured.

For this purpose, the shipping industry must strive to stabilize the operation through long-term guaranteed cargo contracts in order to cope with changes in the market situation and take countermeasures to deal with changes in the exchange rate, while the government must secure sufficient long-term capital to finance the construction of Japanese ships and, at the same time, implement various measures which will help stabilize the operation, including effective tax measures which will enable the shipping industry to keep some of the profits made during good periods and use it as private capital for shipbuilding during hard times.

More recently, as a result of widespread energy conservation efforts and a slowdown in economic activities, the prospect for energy needs is being reevaluated. This, together with the oil glut, has resulted in the energy situation changing constantly.

The environment surrounding the shipping industry is becoming increasingly harsh as a result of the overall weakening of the shipping market, so the operations of the shipping industry are expected to become even more difficult. At the same time as the industry is expected to try harder, the administration would like to insure that Japan's energy security will not be compromised by taking appropriate measures at the proper time according to the basic guidelines described above.

表1 年度別輸出入積取り比率の推移（単位：1,000M/T，%）

(1) 年度	(2) 輸出			(3) 輸入		
	総量A (4)	邦船B (5)	B／A	総量A (4)	邦船B (5)	B／A
45	41,914	15,682	37.4	483,565	216,212	44.7
46	50,297	17,186	34.2	489,804	222,867	45.5
47	50,741	13,614	26.8	533,303	221,802	41.6
48	50,998	13,278	26.0	607,118	260,063	42.8
49	66,946	15,227	22.7	599,721	248,511	41.4
50	62,222	14,408	23.2	554,897	256,461	46.2
51	71,383	14,575	20.4	592,429	271,753	45.9
52	73,932	15,516	21.0	581,867	253,037	43.5
53	73,740	15,290	20.7	578,409	237,419	41.0
54	76,931	15,919	20.7	613,411	235,822	38.4
55	76,040	15,400	20.3	602,265	225,118	37.4

Table 1. Yearly changes in import-export loading ratio (unit: 1,000 M/T, %).

表2 日本船，外国用船別船腹量推移

(6) 年度	(7) 日本船 (A)			(8) 外国用船 (B)			(9) 合計 (C)	
	隻 (10)	総トン (11)	(A)／(C) ×100	隻 (10)	総トン (11)	(B)／(C) ×100	隻 (10)	総トン (11)
45年	1,508	21,185	75.1	462	7,030	24.9	1,970	28,215
46年	1,531	24,130	70.5	592	10,113	29.5	2,123	34,243
47年	1,580	27,933	69.0	655	12,575	31.0	2,235	40,508
48年	1,476	30,623	63.3	820	17,718	36.7	2,296	48,341
49年	1,427	32,620	59.8	973	21,958	40.2	2,400	54,578
50年	1,317	33,485	56.3	1,152	26,003	43.7	2,469	59,488
51年	1,274	34,649	55.1	1,142	28,289	44.9	2,416	62,938
52年	1,234	33,722	53.7	1,174	29,108	46.3	2,408	62,830
53年	1,204	33,030	50.6	1,290	32,288	49.4	2,494	65,318
54年	1,188	33,344	52.9	1,200	29,677	47.1	2,388	63,021
55年	1,176	34,240	52.5	1,329	30,987	47.5	2,505	65,227
56年	1,173	34,465	55.6	1,232	27,475	44.4	2,405	61,940

(12) （注） 1. 対象船舶は，すべて2,000総トン以上の外航船である。
2. 日本船は，日本船主協会の「日本商船船腹統計」から内航船を除いたものであり，外国用船は海運局外航課調べによる。

Table 2. Cahnges in tonnage of Japanese ships and chartered foreign ships.

Key:

1. FY
2. Exports
3. Imports
4. Total Volume A
5. Japanese Ships/B
6. Year
7. Japanese ships (A)
8. Chartered foreign ships (B)
9. Sum (C)
10. Number of ships
11. Total tonnage

12. Note: 1. The subject ships are all oceangoing ships larger than 2,000 tons. 2. Data on Japanese ships was taken from "Japanese merchant marine tonnage statistics" compiled by the Japanese Shipowner's Association by deleting the non-oceangoing ships. Data on foreign ships was based on investigation of the Oceangoing Section of the Shipping Bureau.

Harbor Construction

Tokyo ENERUGI FORAMU in Japanese May 82 pp 114-116

[Article by Makoto Yoshimura, former director of Ports and Harbors Bureau, Ministry of Transport: "Harbor and Pier Maintenance in the New Energy Era"]

[Text] Consolidating New Policy Centered Around Coal Countermeasures

Rapidly Increasing Overseas Ordinary Coal

With the second oil crisis in 1979 was a turning point, the development and utilization of oil substitute energy became an urgent topic pursued worldwide. Coal, with rich reserves and a relatively low price, was given an elevated position as an important oil substitute energy by international consensus. In Japan, the utilization of coal is expanding rapidly centered around the cement industry, and in 1980 overseas ordinary coal imports reached 7.2 million tons, four times that of the previous year.

According to the "Long-Range Energy Supply and Demand Tentative Prospects" issued in August 1979, the demand for overseas ordinary coal in 1985, 1990, and 1995 is expected to increase rapidly to 22 million tons, 53.5 million tons, and 80.5 million tons, respectively. In this connection, according to an estimate by the authority concerned, the demand of 53.5 million tons in 1990 may be broken down according to application as follows: electric power occupies the majority, 74 percent, and the remaining 26 percent goes to nonelectric applications. In electric power application, new coal-fired power plants occupy 58 percent of the total, while in nonelectric application, the cement industry occupies 22 percent.

Topics Related to the Utilization of Overseas Ordinary Coal

There are four main topics related to the utilization of overseas ordinary coal to be considered in Japan, which depends heavily on overseas supply of primary energy, including oil.

1. Insurance of stable supply.
2. Reduction in transportation costs.
3. Maintenance of domestic supply framework.
4. Dust countermeasures and effective utilization of coal ash.

In regard to the first item, "insurance of stable supply," we must diversify the supplying countries and support the supplying countries in maintaining the infrastructure related to transportation so as to help stabilize the amount as well as the price of supply.

In regard to the second item, "reduction in the transportation cost," we must construct large transport ships, develop shallow-draft ships, and develop new transportation technology such as slurry transportation in order to guarantee an inexpensive supply.

In regard to the third item, "maintenance of domestic supply structure," we must maintain import harbors which are properly arranged and designed to handle the type of transport ships involved, establish a domestic secondary transportation network, and establish appropriate stockpiles and reserves in order to insure smooth supply to the user.

In regard to the fourth item, "dust countermeasures and effective utilization of coal ash," we must improve the technology to combat the dust problem, turn coal ash into a resource, and effectively utilize coal ash as a filler material for reclamation work in order to promote utilization of overseas ordinary coal.

The Strategy for Harbors in the New Energy Era

The strategy for harbors in the new energy era in connection with the topics described above is as follows:

1. Maintenance of Harbors To Promote Location of Coal-Fired Power Plants.

The total electric power generating capacity at the end of March 1981 was 129.35 million kilowatts, nearly 70 percent of which was from thermal power generating facilities centered around oil-firing. To meet the increased demand for electric power in the future, we must expand significantly the coal-fired thermal power plants. For this purpose, we must maintain harbors with breakwaters and navigational routes necessary for receiving overseas ordinary coal in order to promote the location of coal-fired thermal power plants.

Included in the sixth 5-year harbor maintenance plan are projects for the maintenance of breakwaters and navigational routes in accordance with the "energy harbor system" to be carried out at Tomakomai, Noshiro, Soma and Misumi harbor (tentative name, in Shimane Prefecture).

Moreover, the necessary assistance will be given as new requests are made in the future.

2. Promotion the Maintenance of Harbors Receiving Overseas Ordinary Coal

For the maintenance of harbors receiving overseas ordinary coal to be used by plants other than new coal-fired thermal power plants, including converted fuel power plants, cement plants, and paper pulp plants, we must carry out planned maintenance according to a nationwide program.

(1) Nationwide program for harbors receiving overseas ordinary coal.

In order to be able to supply overseas ordinary coal to consumers nationwide economically and smoothly, the harbors receiving overseas ordinary coal must have their arrangement and scale properly chosen by taking into consideration the following factors jointly: the regional distribution of the consumers, the exporting country, the type of oceangoing ships involved, the condition of harbor maintenance and the condition of the secondary transportation system.

(2) Guidance concerning the maintenance of private coal piers.

As to privately owned coal piers, the existing piers for handling the coking coal are utilized today to handle overseas ordinary coal also. However, these piers cannot handle large quantities of overseas ordinary coal because of limitations in their load-handling machines and their storage space. It is anticipated that new piers must be built and the existing pier facilities must be expanded in the future. For this purpose, the government is currently carrying out a study so that it may be able to give guidance on matters related to the facility design, to assist in the maintenance of breakwaters and navigational routes, and to mediate in raising capital for the maintenance of pier facilities, as part of its guidance on the maintenance of private coal piers according to the nationwide program.

(3) Promoting the maintenance of public coal piers.

The existing public coal piers are also unable to handle large quantities of overseas ordinary coal because of limitations in their pier water depth, their load-handling machines, and their coal storage space.

Therefore, we must, in accordance with the nationwide program, promote the maintenance of special piers according to the goods they handle: piers which can handle large quantities of coal efficiently and also general public piers in harbors where relatively small amounts of coal must be handled together with other goods.

Included in the sixth 5-year harbor maintenance plan are projects related to the maintenance of special piers according to the goods they handle at Muroran, Ofunewatashi, and Yokkaichi, and general public piers at Kushiroji, Himegawa, and Nagoya harbor.

Moreover, for these public piers, funds must be secured for the maintenance of the pier facilities, the pier management system must be maintained, and environmental protection measures such as those concerning dust control must be implemented. Regarding "the maintenance of the management system at public piers," in particular, we would like to take the initiative in guiding the maintenance of the pier management system by establishing a cooperative company consisting of the shipper and the harbor transportation business representatives in order to promote fair and efficient use of public piers handling large quantities of coal.

3. Maintenance of Harbors for the Purpose of Area Development

It is also necessary to maintain harbors which can contribute to development of the area in conjunction with maintaining harbors for receiving overseas ordinary coal at new locations for coal-fired thermal power plants.

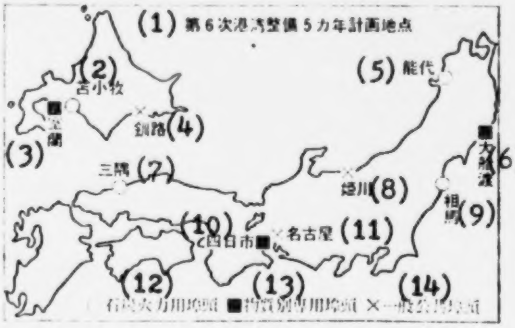
(1) Maintenance of public harbor facilities.

In conjunction with the maintenance of harbors for importing overseas ordinary coal at new locations of coal-fired thermal power plants, the public harbor facilities must also be maintained for the purpose of "securing an economic and stable supply of goods for living," "area development through introduction of new industries," "development of area industries such as fishing," and "securing a refuge for ships."

(2) Securing of land required for area development.

In conjunction with maintenance of the public harbor facilities, we must also work to secure land required for area development (such as land for public facilities, land for city living facilities, green tracts, and land for recreation). In doing so, it is important to work for appropriate utilization of the land reclaimed with the use of coal ash.

Furthermore, in the future, the prospect of harbors for receiving overseas ordinary coal and the addition and selection of harbors and maintenance of the facilities must be managed in such a way as to match the changes in the situation of coal supply and demand.



Key:

1. Figure 1. Project sites of sixth 5-year harbor maintenance plan.
2. Tomako mai
3. Muroran
4. Kushiroji
5. Noshiro
6. Ofunewatashi
7. Misumi
8. Himegawa
9. Soma
10. Yokkaichi
11. Nagoya
12. Pier for coal-fired thermal power plant
13. Special pier according to goods handled
14. General public pier

Energy Harbor System

This is a new system implemented by the Transport Ministry in 1980. It was established for the purpose of promoting the maintenance of large harbors which can become Japan's various energy bases. It is to be implemented as a public enterprise based on the assumption that it coexists with the general public utilization and the concerned business units (the harbor manager and the beneficiary) from which the Ministry will tax appropriately.

The objectives of this new system are to work for a stable supply of energy, to work for efficient utilization of both public and private investments, and to promote efficient utilization of the coastal regions.

The "energy harbor system" applies to 1) important peripheral harbor facilities (such as breakwaters) and water facilities (such as navigational routes), and 2) facilities which will benefit the general public as well as those concerned with energy.

The business burden allocation is shown in Table 1. The beneficiary, such as the electric power industry, can achieve dispersion of the cost burden with the harbor manager.

In 1980, the nation's share of the burden came to 1.6 billion yen for three harbors: Tomakomai (coal-fired thermal power, oil storage), Aokata (oil storage), and Mizushima (oil refinery). The 1981 budget was 7.3 billion yen for four harbors: in addition to Tomakomai and Aokata, Noshiro (coal-fired thermal power) and Soma (coal-fired thermal power).

The 1982 budget is to be 7.1 billion yen for four harbors: in addition to Noshiro and Soma, Misumi (coal-fired thermal power) and Niigata East harbor (LNG).

エネルギー港湾制度の費用分担 (1)

施設 (2) (5) 負担者	(3) 水域施設（水深, m）			(4) 外かく施設
	13以下	13〜19	19〜24	
(6) 国	$\frac{2.5}{10}$	$\frac{1.25}{10}$	$\frac{0.5}{10}$	$\frac{2.5}{10}$
(7) 港湾管理者	$\frac{2.5}{10}$	$\frac{1.25}{10}$	$\frac{0.5}{10}$	$\frac{2.5}{10}$
(8) 受益者	$\frac{5}{10}$	$\frac{7.5}{10}$	$\frac{9}{10}$	$\frac{5}{10}$

(9)（注） 北海道，沖縄，離島については地域特例（受益者負担割合が上記割合より小）がある。

Key: 1. Table 1. Allocation of cost for energy harbor system.
2. Facilities
3. Water facilities (water depth, m)
4. Peripheral facilities
5. Cost bearer
6. State
7. Harbor manager
8. Beneficiary
9. Note: Special rule applies to Hokkaido, Okinawa and offshore islands (smaller allocation for the beneficiary).

Special Ship Construction

Tokyo ENERUGI FORAMU in Japanese May 82 pp 121-123

[Article: "Special Energy Transportation Ships Can Contribute to Reduction of Energy Cost"]

[Text] To Stabilize the Operational Base of a "Shipping Giant"

The special automobile ship "Oihama Maru" went on its maiden voyage on the U.S.-Japan route in 1965. The Oihama Maru is part of the Mitsu merchant fleet, and has a long-term guaranteed cargo arrangement with Nissan Motors. Although at that time a ship could carry only about 700 cars, the advantage of a special automobile ship was quite significant. Later on, ships capable of carrying 5,000 cars each appeared, and the transportation cost was cut to half that required without the use of the special ships.

The steel industry, too, strived to strengthen its international competitive edge by significantly reducing the cost of shipping the coking coal through the use of special coal ships. It is not an overstatement to say that Japan's automobile and steel industries, which are leading the world in both technical power and international competitive edge, owe their prosperity (at least in part) to the securing of special ships.

To Reduce Energy Transportation Cost Through Use of Japanese Ships

Now then, how about marine transportation in Japan's energy area? In particular, how about special ships for LNG and LPG, which will be the focus of future oil substitute energy? As shown in Figure 1, the share of Japanese ships is only 20 to 40 percent. No Japanese ships at all are used for LNG transportation at present. Including chartered foreign ships, the percentage barely reaches 81 percent for oil transportation, 78 percent for coal transportation, and 67 percent for LPG.

The percentage of special ships used in the field of substitute energy among Japanese ships is surprisingly small. For example, including those now under construction, the special coal ships centered around those used for the transportation of ordinary coal to be used as oil substitute fuel at coal-fired thermal power plants, with long-term guaranteed cargo by the Electric Power Development Co, Ltd, are only four in number, with a total tonnage of only about 500,000 tons (cargo weight tonnage, same throughout) nationwide.

If 50 million tons/year of ordinary coal are to be transported in 1990, then a shortage of ships amounting to 3-4 million tons is to be expected.

On the other hand, there are no Japanese ships for LNG transportation at all today. In view of the fact that the demand for LNG is expected to triple by 1990, the need for special Japanese ships is urgent.

This means that, as far as the substitute energy field is concerned, the use of Japanese ships and special ships is lagging far behind, and this means a higher cost for transporting substitute energy.

Construction of Special Coal and LNG Ships

However, Japan's shipping industry is steadily increasing the number of substitute energy special ships in its fleet. For example, the Electric Power Development Co, Ltd, has four special coal transportation ships today. They are the "Seikai Maru" (69,600 tons) owned by Nippon Yusen, the "Seto Maru" (62,412 tons) owned by Nippon Steamship, the "Shyoho Maru" (69,600 tons) owned by Shinwa Shipping, and the "Kouryuzan Maru" (69,300 tons) owned by Osaka Steamship Mitsui Senpaku. This is the largest fleet of special ordinary coal transportation ships with long-term guaranteed cargo by a single company existing today.

The outstanding features of the special coal transportation ships include the following: 1) the shape of the ship is such as to facilitate loading of coal and to enhance the loading efficiency, and 2) the type of ship most suitable for a specific route and for getting in and out of a specific harbor can be chosen. These ships are also made to conserve fuel.

In addition to the Electric Power Development Co, Ltd, special ordinary coal transportation ships for the cement, steel, and petrochemical industries are provided by Nippon Yusen, and Mitsubishi Ore Transport, among others.

On the other hand, so far there are no Japanese ships engaged in the transportation of LNG. However, with the expanded introduction of LNG, the desire of Japan'e shipping industry to build LNG transportation ships is also growing stronger. The first stage involves a project to increase LNG imports from Badak, Indonesia. The project consists of importation of 2.2 million tons of LNG per year over a period of 20 years starting in 1983 from Prutamina (state-owned oil company) by a group of four companies consisting of Chubu Electric Power, Kansai Electric Power, Osaka Gas and Toho Gas.

For the transportation of Badak LNG, three Japanese companies--Kawasaki Steamship, Nippon Yusen, and Osaka Steamship Mitsui Senpaku--have started to construct Japanese LNG ships. These three companies will build three special LNG ships jointly, with each company owning one-third of each ship. The reason each company did not wish to own one ship each was to disperse the risks in case everything should happen to one of the ships. Because the cost is 30 billion yen per ship--more than twice the cost of constructing a large tanker of the same scale--the project must be handled with prudence. In the actual operation of the ships, each company will be in charge of one ship. The first ship is expected to begin regular service between Japan and Indonesia starting in March 1983.

Another LNG ship construction project is related to a project to increase LNG imports from Arun, Indonesia. Four special LNG transportation ships will be built and owned jointly by the following companies according to the ratio in parentheses: Nippon Yusen (1.4), Osaka Steamship Mitsui Senpaku (1.1), Kawasaki Steamship (0.8), Japan Line (0.3), Yamashita-Shinnihon Steamship (0.2), and Showa Shipping (0.2). The first ship is expected to begin service in May 1983.

Japan's shipping industry did not own any LNG ship in the past. It was somewhat unworthy of the name "shipping giant Japan," but this was because the ship price as well as the operational risks were so high.

That is why in the case of the Badak project, even the large companies are approaching the project with caution in order to disperse the risks by means of joint ownership.

As to future LNG construction plans, I am sorry to say that there are no specific projects under consideration. Not only are the ship costs and the risks too high, but also the right to select the LNG ship used in long-term LNG contracts often is in the hands of the supplier. That is why there are no plans for the construction of special ships by Japan's shipping industry in connection with the plan to import LNG from Western Australia, even though the project is said to be a large-scale project.

However, oil transportation remains the favorite among the types of energy transportation today, that is, tanker transportation. In the field of tanker transportation, Sanko Steamship and Japan Line are the most powerful. However, the tanker business has fast become a difficult field in which to operate, because it was hit hard by the "stagnation" resulting from the worldwide reduction in the demand for oil. The shipping industry wishes to move into the substitute energy field and make it a stable source of income by increasing the number of special ships owned.

Stable Shipping Operation and Economic Security

The proportion of trade in the oil-related field, including crude oil, oil products, and gas, reaches approximately 40 percent of the total world trade. The situation is the same in Japan's shipping industry also. In 1981 (according to Lloyd's listing), 45 percent of Japan's total merchant ship tonnage was made up of tankers and gas transport ships.

The oil transportation business is in a difficult situation today due to a worldwide decline in demand for oil. If the world's "crude oil and oil products shipping volume" and "the tanker tonnage" in 1970 are represented by an index of 100 each, then while the 1981 index for the shipping volume was 116, showing little charge from that in 1970, the index for the tonnage was more than double that in 1970. This abnormal phenomenon of excessive tanker supply resulted in the "stagnation of the tanker business."

In addition, the shipping market can fluctuate as much as 20 times on occasions. That is why the shipping industry's desire to establish a stable operational base through the ownership of more special substitute energy transportation ships is so strong today.

This trend is probably also beneficial to the user. Take the case of coal transportation, for example. There is a school of thought that says that the use of chartered ships over a period of 3-5 years might be cheaper than the use of special ships, because depending on the period it can be cheaper than the use of special ship.

However, according to an estimate made by a certain shipping company through a comparison of costs in transporting coking cool over a period of 10 years using the two different methods, "the special ships are more advantageous after all."

Whether or not a further expansion of coal imports can be realized depends on the establishment of a coal network, in which marine transportation occupies an important position. In order to realize effective and stable transportation of ordinary coal, the use of special ships appears to be the most effective means after all.

In the area of LNG ships, where there are a large number of foreign LNG ships, it may appear that there is no need for building Japanese LNG ships. However, to the Japanese shipping industry, ownership of LNG ships is related to the establishment of a stable profit base, which can provide reserve power for positive promotion of the construction of more new substitute energy ships.

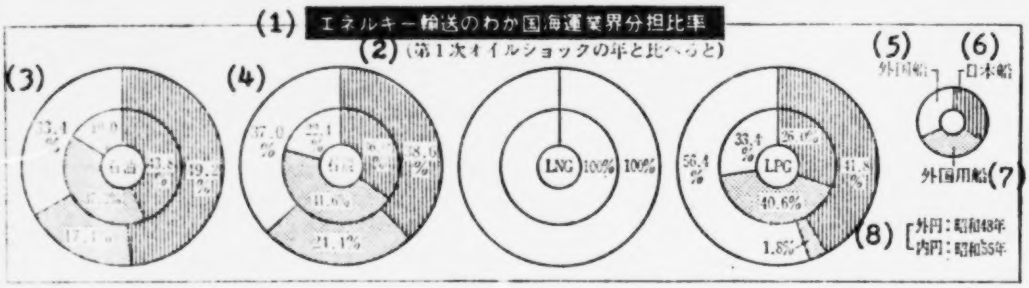
Ministry of Transport, Too, Takes Positive Measures

On the other hand, the government has just begun to put emphasis on a substitute energy fleet consisting of Japanese ships.

An "interim report of the shipping policy working group of the Shipping and Shipbuilding Rationalization Council" of the Ministry of Transport published in August last year stated: "Construction of ships for the transportation of oil substitute energies such as LNG, coal, and LPG which are so important for guaranteeing Japan's economic security must be undertaken positively."

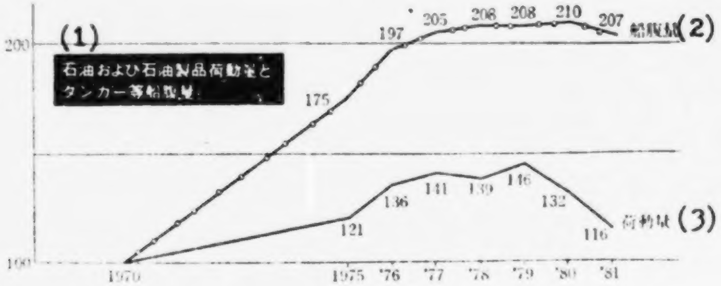
A "report of the overseas coal transportation problem study group" of the Ministry of Transport (March 1982) also stated that as the import of ordinary coal is expanded, "it is important to work for the maintenance of Japanese ships," thus establishing the importance of ships which are suitable for the volume of cargo and the harbor situations involved.

Nevertheless, this is a period in which an interest supplement to the shipping industry regarding planned shipbuilding is not in effect. The time has come for the government to take positive measures to promote the construction of substitute energy transportation ships, including low-interest loans.



Key:

1. Figure 1. The share of Japan's shipping industry in energy transportation.
2. Comparison with the year of the first oil shock
3. Oil
4. Coal
5. Foreign ship
6. Japanese 8. Outer circle: 1973
7. Chartered foreign ship Inner circle: 1980



Key: 1. Figure 2. Oil and oil products shipping volume and tanker tonnage

2. Tonnage

3. Shipping volume

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POLITICAL ALLIANCE BETWEEN TANAKA, TAKEIRI ANALYZED

Tokyo SENTAKU in Japanese Jul 82 pp 50-53

[Article: "A Study of the Relationship of Sworn Friendship between Tanaka and Takeiri--as a Factor in Predicting the Political Situation"]

[Text] Although the political situation appears relatively calm on the outside, on the inside it is rather entangled. After the verdict was handed down to the defendants in the All Nippon Airways case of the Lockheed incident on 8 June, the degree of entanglement increased further.

Upon his return from a long trip that included attendance at the Versailles summit conference and the UN special session on arms reduction, Prime Minister Suzuki bluffed by saying that he would deal with management of the political situation "in the natural course." His comment has been considered an antonym disguising his tension. The political situation seems likely to emerge from its present entanglements and begin moving in the latter half of the year.

Mystery of the Forced Extension of the Diet Session

In the unstable political conditions of recent times, the words and actions of Yoshikatsu Takeiri, chairman of the Komei Party, have been talked about with an air of mystery. More precisely, people are watching for changes in the honeymoon relationship between Takeiri and former Prime Minister Tanaka. Anything can become a trigger for a disturbance in the political arena. In any case, people are not mistaken to cast suspicious eyes on the Tanaka-Takeiri relationship.

At a closed session of the Komei Party's national secretary generals' meeting held last 9 October, Takeiri spoke with full confidence: "I have done what I should do. Although the issue of allowing corporate contributions to political parties still remains, I cannot launch out that far. I feel as though I can resign the party chairmanship at any time. But I will not resign at the next party convention (December 1981)." "What I should do" meant a series of Takeiri policies which tilted to the right. They included the party's recognition of the constitutionality of the Self Defense Forces, the party's acceptance of the Japan-U.S. Security Treaty, and moreover a scheme to obtain political power that implied coalition with the LDP. Takeiri meant that he had established his tilt-to-right line in the party.

Last September, when Takeiri visited the PRC, he declared in front of the leading Chinese officials that "the Komei Party will certainly participate in an administration."

While in China, Takeiri contacted Suzumu Nikaido (then chairman of the LDP Executive Committee) at a hotel. This was spoken of for a time as "a mysterious secret meeting in Beijing." At that time some Komei Party members publicly made it clear that a scheme to obtain political power meant coalition with a force consisting primarily of the LDP's Tanaka faction. The Komei Party's recognition of the constitutionality of the Self Defense Forces was explained as necessary to reduce the gap in policies with the LDP that stood in the way of a coalition.

Takeiri dared to confirm his intention not to resign in the foreseeable future at the secretary generals' meeting. After completing the tilt-to-right line, he also wanted to realize with his own hands the Komei Party's participation in the government--that is how others view his ambition. Concerning Takeiri, who holds the longevity record--15 years--as chairman of a party in Japan and is still extending his record, whispered rumors of his resignation as the chairman have been heard at every party convention in the last several years. Last year, he denied the rumor by himself.

This year, however, the situation is different. The spreading rumors of his resignation are more realistic than ever. The trigger for the rumors was the long 94-day extension of the Diet session passed on 19 May. The Komei Party was the most strongly opposed to the long extension. Takeiri alone boycotted Suzuki's meeting with opposition party heads on 28 May, just prior to the prime minister's trip abroad. Takeiri explained his reason for the boycott as follows: "In order to pass an unconstitutional bill revising the Public Officials Election Law (revision of the nationwide electoral districts for the Upper House), the LDP forced the passage of an unprecedentedly long extension of the Diet session. I boycotted the meeting in order to protest the outrageous action of the LDP. In the following half month, the Komei Party boycotted all discussion in the Diet. Takeiri maintained a stubborn attitude that seemed abnormal. The Komei Party had been considered as an understanding, cooperative party by the LDP. But is completely changed its attitude. Takeiri's staff said: "This time is different. We do not mind being isolated in the Diet." There have even been times when Junya Yano, the party's secretary general, wondered why Takeiri was being so stubborn. Both party insiders and people outside the party suspected that Takeiri was anticipating something in his heart. That also led to rumors of his resignation. However, nobody knew what it was.

Without question, revision of the nationwide electoral districts for the Upper House will put the Komei Party in a disadvantageous position. Under the current system, the Komei Party has divided the country into nine blocs, nominated one candidate in each bloc, and elected all nine. The system is incomparably more efficient than that of other parties. If the proportional representation system proposed by the LDP is applied to the number of votes in the Upper House election in 1980, seven of the Komei Party's candidates would have been elected. The party would have lost two seats. According to the proposed revision, people will vote for a party. Since independent voters are averse to the name of the Komei Party, the party fears that the number of votes from independent voters will decrease drastically.

Takeiri's anger, however, stemmed not just from the effect the revised law would have on the party. Until just before the long extension of the Diet session was suddenly suggested, Takeiri is said to have assured his staff that "there will be no extension. Therefore, there will be no revision of the nationwide districts. Since it is said so there (Mejiro), it is true." It has been common knowledge for some time within the Komei Party that Takeiri and Mejiro (Tanaka) have been closely exchanging information on the political situation and elections. Takeiri, being bold, has not tried to hide it.

So the long extension of the Diet session was a complete surprise to the Komei Party. Morevoer, the LDP intends to force passage of the bill to revise the nationwide districts, which the Komei Party is determined to prevent with all its power. Therefore, people assume that Takeiri was doubly humiliated. Because of his mistaken outlook on the situation, he has lost face within the party. Moreover, it will be difficult to regain party strength. In the double election to both houses in June 1980, the Koemi Party's seats in the House of Representatives fell from 58 to 34. Later, a leading member of the Democratic Socialist Party said: "Since the election was held in June, the extent of the Komei Party's damage was only that much. If the election had been held a half year later, it would not have received even 30 seats due to the troubles of the Soka Gakkai and the Ikeda scandal. It would have become the fourth opposition party." Next year's Upper House election will be the first election at the national level since the decrease in their forces. To Takeiri it will be the election that determines his party's fate. But if the system itself is revised to their disadvantage, there will be no hope for Takeiri. Moreover, the person who is promoting the revised bill is Kakuei Tanaka, with whom Takeiri is supposed to be connected by an interdependent relationship based on trust....

The View That a Cozy Relationship Still Exists

When Takeiri boycotted the meeting of the party heads, rumors that Tanaka and Takeiri had ended their relationship circulated among politicians. "It was Takeiri's retaliation for being betrayed by Tanaka. Takeiri finally seems to have abandoned his role as the Tanaka faction's detached force." Within the Komei Party, some leading members who have been concerned about Takeiri's relationship with Tanaka said: "This is a good opportunity. Isn't it a chance for us to deny publicly the suspected relationship with the Tanaka faction? What we should do now is thoroughly shake up the government and the LDP." Some thought a crack had occurred in the Takeiri-Tanaka relationship, while others expected a crack to occur in the future. At any rate, the Komei Party members felt a change was occurring in the honeymoon between the two.

On the other hand, there was a completely different view. Some in the political arena said their cozy relationship still existed. In other words, Takeiri and Tanaka were after all connected at the level of wheels within wheels and players of a play. One ground for this view is Takeiri's remark on Diet dissolution.

At noon on 21 May, 2 days after passage of the long extension of the Diet session, the Komei Party held "An Urgent Grand Oratorical Street Meeting To Oppose Flatly an Undesirable, Unconstitutional Amendment of the Upper House Nationwide Districts" at the East Entrance Plaza of Shinjuku Station in Tokyo. On this occasion Takeiri called for dissolution of the House of Representatives, saying: "The undesirable amendment of the Upper House nationwide districts is an outrageous act against democracy. Since this issue will affect Japan's future, isn't it the right course for party politicians to ask the people for confidence rather than just discussing the issue in the Diet?"

Political circles were surprised and wondered. Every party and Diet member wants to put off Diet dissolution and general elections even if only by 1 more day in the future. Since it has been only 2 years since the previous election, the time is not yet ripe. However, one thing that concerns Diet members is the Tanaka faction's forceful method of managing the political situation. Whenever criticism of the Tanaka faction's management or of the Lockheed incident has arisen this year, the Tanaka faction has suggested Diet dissolution this year, and thereby used it as a threat. Since nobody knows when a potential threat may become a real threat, this is a first class weapon of Tanaka's.

Even after the 8 June verdict, as if rising criticism of Tanaka was guaranteed, a rumor of an election on 3 October was spread with seeming truth. For a certain time every party was restless. Takeiri's remark on Diet dissolution can be viewed as a way to keep in step with the Tanaka faction's strategy. Therefore, the view that their cozy relationship still exists cannot be denied.

Both views, that the relationship has been broken or that it still exists, however, seem to tell only one aspect of the truth. Before the 8 June verdict, New Liberal Club President Seiichi Tagawa invited the heads of the four middle-of-the-road parties to a meeting to be held just after the verdict. Takeiri, however, would not respond by saying: "When we gather, what are we going to do?" Tagawa intended to launch into an anti-Tanaka and antiplutocracy campaign in the form of an appeal by the four party heads. But Takeiri did not go along with Tagawa. It is too simple, however, to jump to the conclusion that Takeiri was trying to defend Tanaka.

The connection between Tanaka and Takeiri is certainly old and strong. When the Soka Gakkai and the Komei Party were accused of interfering with freedom of speech and press (1970), Tanaka (then LDP secretary general) tried to save Takeiri in a pinch. When Japan and the PRC normalized their diplomatic relations under the Tanaka administration (1972), Takeiri played the role of a middleman. When the Komei Party cooperates with the Socialist Party or the Democratic Socialist Party in elections, the Komei Party always takes care not to disturb the Tanaka faction's candidates. The Takeiri and Tanaka relationship is almost indivisible.

After a miserable defeat in the 1980 double election, the Komei Party was further attacked on the issue of summoning Daisaku Ikeda to the Diet. "A Group To Inquire into the Soka Gakkai's Social Wrongs" collected 500,000 signatures and filed a petition through an LDP Diet member to summon Ikeda to the Diet. This time, too, Tanaka encouraged the weak Takeiri by saying: "Don't worry. Think of me when I was severly accused in the Lockheed case." Then, Tanaka is said to have warned Yoshio Sakurauchi, then LDP secretary general, "not to be drawn into the petition summoning Ikeda to the Diet." This time, it was Tanaka who has found himself in a pinch. If their close relationship is revealed more clearly than ever, however, criticism of Tanaka becomes criticism of the Komei Party. If Takeiri handles the situation unskillfully, it may render the rebuilding of party strength impossible. Takeiri seems to have fallen into a dilemma, and his inner struggle seems to have intensified.

"Only I Can Make Tanaka Retire"

When the movement to merge the four middle-of-the-road parties suggested by Democratic Socialist Party Chairman Ryosaku Sasaki ran into trouble in the spring of last year, Takeiri, who had been cool toward the idea from the beginning, told his staff: "By any stretch of the imagination, it will be the Tanaka-Ohira group if we pair up with the LDP. Although (Ikko) Kasuga is dealing with the Fukuda and Nakagawa group, I cannot do likewise. Even if the four parties merge, and the resulting party ends of cooperating with Fukuda under Kasuga's leadership, we will lose the purpose behind the merger of the four parties. Nikaido is opposing to a new middle-of-the-road party. He is concerned that the new party emerging from the merger of the four would take an independent course as a new power. That may be the case. Although the Komei Party's seats are limited to 30 or 40, the Tanaka faction may want us to remain as we are to provide insurance. However, Tanaka may not be albe to recover. Even if we make him retire, who is going to persuade him? it may be only me who can do so. Then, I will also resign..." This story is so good that its truth is difficult to ascertain. Even if we assume that Takeiri really said this, it does not necessarily mean that Takeiri harbors the same feeling now.

From Takeiri's remarks it is clear that the Tanaka-Takeiri relationship is involved even in the issue of the merging of the four middle-of-the-road parties; therefore, Takeiri, who is on Tanaka's side, cannot agree with the Democratic Socialist Party, which is close to Fukuda. For this reason, when Tagawa recently made clear his anti-Tanaka and antiplutocracy position, approached Fukuda and Miki, and asked the Komei Party and the Democratic Socialist Party to go along with the New Liberal Club, it was an annoyance to Takeiri.

Moreover, the Democratic Socialist Party and the New Liberal Club are strongly averse to the Komei Party. At a meeting in Hawaii of the four party s secretaries general (14 June), both parties suggested the idea of merging three middle-of-the-road parties without the Komei Party. When Yano heard the story, he had to say that "it has its own meaning." Nevertheless, he could not hide his feeling of isolation. When Yano was once asked about the merger of the four middle-of-the-road parties and the other parties' antipathy to the Komei Party, he said in a rage: "The Komei Party was founded and raised by Soka Gakkai. I want everybody to take that fact as a premise. If they tell us 'to cut off our relationship with Soka Gakkai' or interfere with our freedom of religion, it will be unsolicited advice. In that case they will have to give up the idea of a merger of the four middle-of-the-road parties." But the Soka Gakkai has been shaking. The party's forces are stagnant. It is isolated within the middle-of-the-road forces. Under these adverse circumstances, the Komei Party is even burdened with damage to its image inflicted by the two persons most criticized by the public--Kakuei Tanaka and Daisaku Ikeda. The Komei Party is in an extremely difficult situation. Takeiri is anxious to find a way out of the difficulty.

Takeiri's "Last Match"

Concerning Takeiri's state of mind, one Komei Party leader explained:

"Mr Takeiri is angry with Mr Tanaka for betraying him on the issue of the Diet extension. However, many things happen in the political arena. Whether or not Mr Takeiri will break his relationship with Mr Tanaka over that sort of problem is a question that belongs to a different level. What Mr Takeiri is most concerned about is how to rebuild the party and the Soka Gakkai. That is all that concerns him. Since he is a warmhearted man, he will think extensively of his relationship with Mr Tanaka. But there is no question that he places priority of the Soka Gakkai and the Komei Party. In this context he should be thinking of bringing the Tanaka issue and the issue of his own retirement to a conclusion. This is the last match where he puts his future and office at stake--I think he is in such a state of mind."

If so, Takeiri's previous remark about resignation together with Tanaka seems to be a realistic synopsis. By not being anti-Tanaka, but by adopting a role that makes Tanaka retire, he can try to elevate the Komei Party--this is certainly a drastic measure.

The matter is, however, not so easy. Even if Takeiri intends to do so, Tanaka's ambition lies elsewhere. Just before the 8 June verdict, Tanaka gave a big talk at a meeting with Nakasone faction members (3 June). "If Nakasone waits quietly and patiently for the moment, he can become LDP president. When I ran for LDP president in 1972, Nakasone supported me. I have not repaid him yet. The time will certainly come for me to repay him. In 5 years or so, I also want to ask for your help again." He meant he would cooperate with the Nakasone faction in order to anoint Prime Minister Nakasone, but in exchange he asked for their help in his own restoration 5 years later. Tanaka showed no sign of retiring. Knowing all Tanaka's intentions very well, Takeiri must be thinking of all the possibilities.

After thought, Takeiri may after all choose a safe course, or he may try his luck for the sake of the party's revival. Takeiri's move on the Tanaka issue is one factor to watch in predicting the political situation.

9896
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ECONOMY

INTERNATIONAL COMPARISON OF LABOR PRODUCTIVITY REPORTED

Tokyo NIHON SEISANSEI HOMBU in Japanese 6 Jul 82 pp 1-8

[Article by Kazukiyo Kurosawa]

[Text] The Nihon Keizai Hombu (Japan Productivity Center; president, Kohei Goshi) recently completed a "Research Study on International Comparison of Labor Productivity." This report is an international comparison of trends and absolute standards of labor productivity based on the real added value.

The study was carried out by the Special Committee on International Comparison of Productivity (chairman, Kazukiyo Kurosawa, professor at Tokyo Institute of Technology) established within the center to carry out contractual study for the Zaidanhojin Sangyo Kenkyujo (Industrial Research Foundation).

Views on Research Study

The international comparison of labor productivity up to now has been conducted mainly by comparing the growth rate (trends) of various nations' productivity. This method enables a comparison of growth rate of productivity but does not show the fluctuation of the absolute standard of productivity.

Therefore, attempts to make comparisons between specific countries have been made at times by measuring the absolute standard of productivity, but only partial or fragmentary results were obtained. Broad measurements of various categories of the economy in many countries were lacking.

In the midst of recent worldwide economic stagnation, various nations are trying to promote economic recovery through improved productivity. For this reason, there is increasing interest in various nations in knowing their position in productivity by making a comparison of the productivity level.

This is an attempt to respond to this interest by measuring the trend in labor productivity as well as the absolute standard of industries and economy as a whole using a uniform method, and on a continuing basis. This is an unprecedented attempt.

Extent of Measurement

1. Labor Productivity of Principal Industries and Economy as a Whole

Targeted Countries:

Europe and United States: Japan, United States, West Germany, France, England, Belgium
Asia : Japan, South Korea, Pakistan, Singapore, Philippines, Thailand

Comparison Year:

Europe and United States: 1970 - 1979
Asia : 1971 - 1978

Measurements for certain years could not be made on certain countries due to lack of basic data.

Area of Comparison:

1) Economy as a whole; 2) agriculture, forestry and fishery;
3) mining; 4) manufacturing; 5) electricity, gas and water;
6) construction; 7) transportation and communications;
8) commerce and service industry.

Measurement Index:

GDP (Gross Domestic Production) per employee in each case.

2. Labor Productivity of manufacturing industries by categories

Targeted countries:

Japan, United States, West Germany, England

Comparison Years:

Japan-United States: 1967 - 1978 and projected estimate for 1979, 1980
Japan-W. Germany : 1975 - 1978
Japan-England : 1970 - 1979

Measurement Index:

Japan-United States: value-added per capita
Japan-W. Germany : value-added per employee
Japan-England : value-added per employee

Measurement Method

1. This survey from beginning to end is a measurement of rough value added labor productivity. In other words, the rough added value of each country and category were converted to the real rough added value based on the 1973

price indicator (1975 price for Asian countries) and divided by the number of employees in each category.

However, total working hours were used in the comparison of manufacturing industries by categories between Japan and the United States.

2. A statistical system of real GDP of each country was used for the rough added value of principal industries.

As for manufacturing industries, the output (or shipment) and the amount of raw materials purchased were divided by the cost index, and the difference was used as the real rough added value (double deflation method).

3. Following this, the rough added value of each country based on the UN calculation of purchasing power parity (PPP) against the 1973 GDP were converted into Japanese yen. However, due to lack of PPP for Asian countries, the average exchange rates of the 5 years 1973-1977 were used. Moreover, the 1973 exchange rate was used in the comparison of manufacturing industries between Japan and the United States.

4. Sources for basic data used are as follows:

Real GDP by Industries

Europe and United States: OECD, "National Accounts of OECD Countries:
Asian countries : UN, "Yearbook of National Accounts Statistics"

Number of Employees by Industries

Europe and United States: OECD, "Labor Force Statistics"
Asian countries : ILO, "Yearbook of Labor Statistics"

Comparison of Manufacturing Industries

Japan : MITI, "Industrial Statistics" (output, cost of raw materials, number of employees)
Ministry of Labor, "Monthly Labor Statistics" (working hours)
United States: Bureau of Labor Statistics, "Census/Annual Survey of Manufacturers" and unpublished data on working hours, investment, output deflator, etc, by BLS
West Germany : Bureau of Statistics, "Statistics Yahrbuch"
United States: BLS, "Business Monitor, PA-1000

Outline of Calculation Results

The calculation results based on the above method are as given below.

(Table 1, Figure 1) Comparison of Labor Productivity Growth of Advanced Nations

Table 1. Labor Productivity Growth Rate by Industry of Advanced Nations (1973 = 100)

Countries (Yrs)	Japan (1979)	U.S. (1979)	W. Germ. (1978)	France (1979)	England (1978)	Belgium (1979)
Overall industry	119.3	101.1	117.1	118.4	104.6	114.9
Agr, Forest, Fish	109.9	114.1	126.1	128.0	115.3	114.5
Mining	111.0	73.8	90.8	118.2	222.1	108.8
Manufacturing	145.1	106.9	115.9	127.0	103.6	135.5
Elec, Gas, Water	130.5	96.5	126.0	131.2	111.1	150.6
Construction	94.3	90.2	117.6	105.3	98.6	108.4
Transp, Commun	114.3	114.4	124.7	120.5	107.5	103.2
Commerce, Service	108.5	98.8	114.5	109.7	102.0	104.9

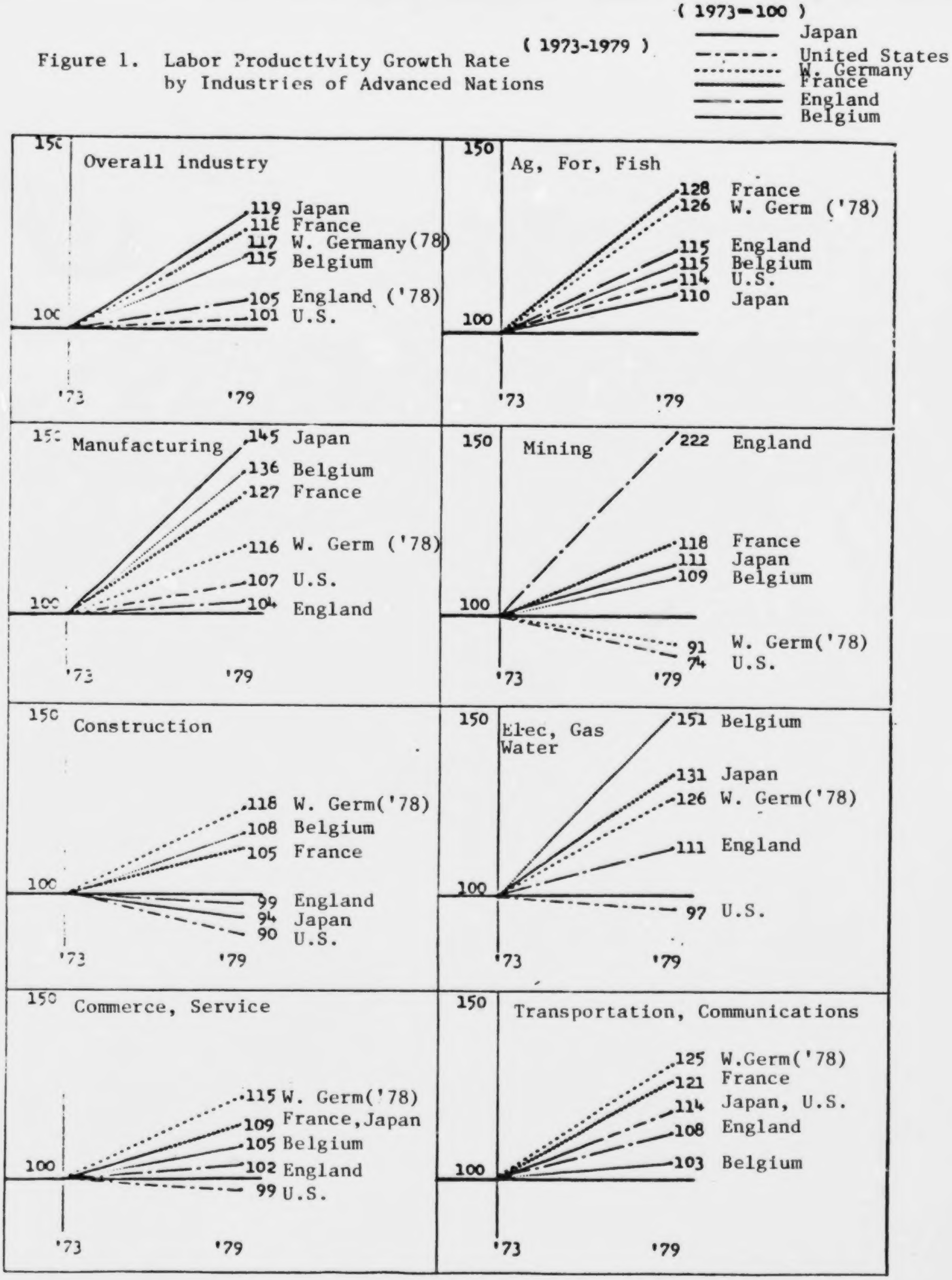
(Note) This table shows real GDP index per employee based on 1973 = 100

Among the industries of the advanced nations, Japan's index of 119.3 for the growth rate of labor productivity since 1973 is the highest for 1979 (1978 for West Germany and England), followed closely by France (118.4), West Germany (117.1) and Belgium (114.9). England (104.6) and the United States (101.1) remained in extremely low positions, showing a conspicuous difference from the other four countries.

Conditions differ according to industries. Japan's high growth rate is based on the manufacturing industrial growth of 145.1, followed by Belgium (135.5) and France (127.0) which also show relatively high rates of growth. West Germany with 115.9 shows a medium rate, but the United States and England remained sluggish at the single-digit growth level.

Following manufacturing industry, Japan shows a large growth rate of 130.5 in electricity, gas and water industries, but remains in third place, following Belgium with 150.6 and France with 131.2. The United States is rather low at 96.5.

Figure 1. Labor Productivity Growth Rate (1973-1979) by Industries of Advanced Nations



As for agriculture, forestry, fishery, mining, transportation, communications, commerce and service industry, Japan's growth is in the medium range among the countries being compared. The construction industry at 94.3 is lower than the 1973 level. This was also true of England and the United States. In general, the United States and England showed stagnant growth, but France, West Germany and Belgium had comparatively good rates of growth.

It is clear that the overwhelming growth of the manufacturing industry played a large part in Japan's favorable growth.

(Table 2, Figure 2) Comparison of Labor Productivity Level of Advanced Countries

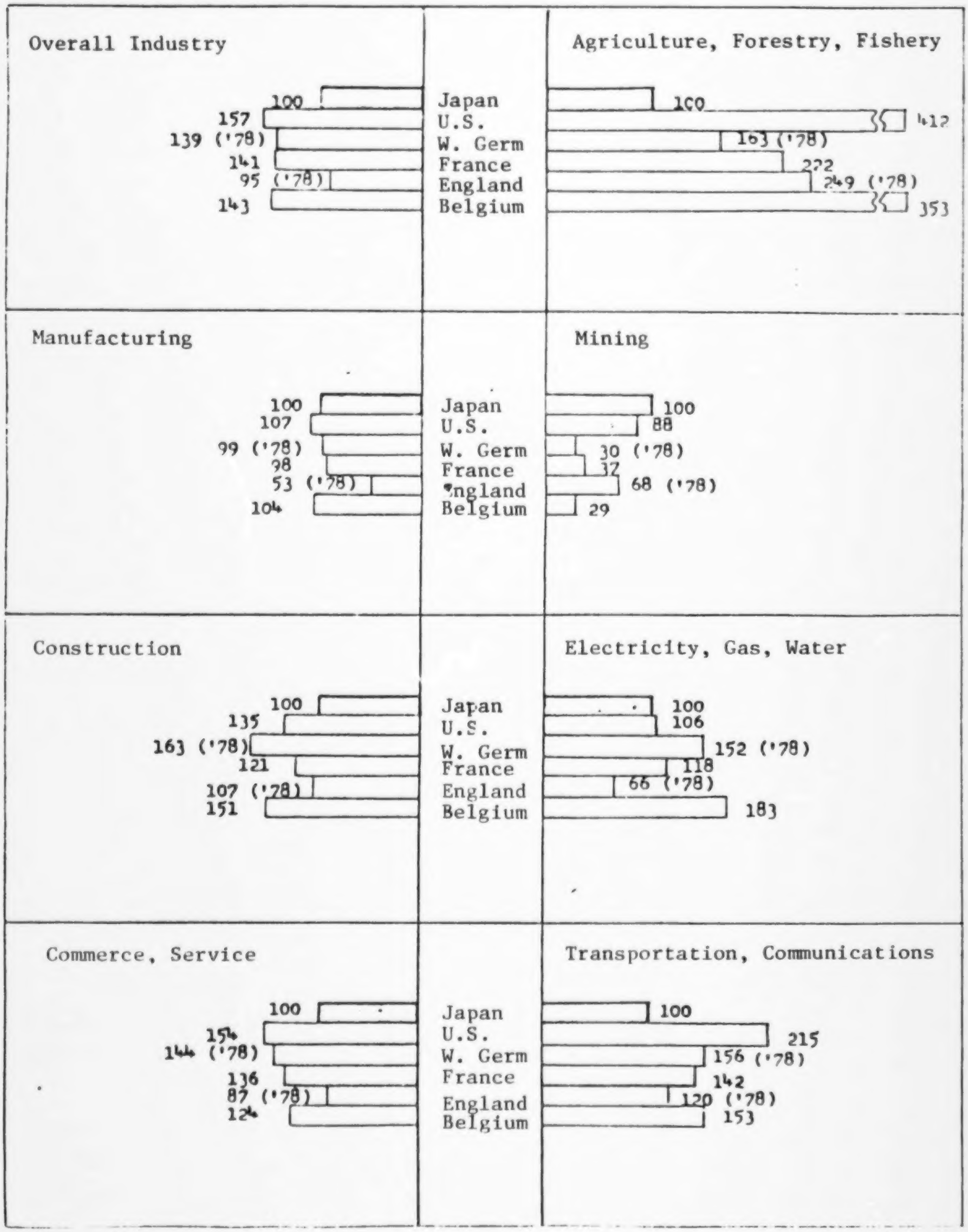
Table 2. Comparison of Labor Productivity Level by Industries of Advanced Nations

Countries (Yrs)	Japan (1979)	U.S. (1979)	W. Germany (1978)	France (1979)	England (1978)	Belgium (1979)
Overall (1000 yen) Industry (Comp)	2,552 100	4,009 157	3,417 139	3,606 141	2,332 95	3,640 143
Agr, For, Fishery	1,040 100	4,287 412	1,561 163	2,306 222	2,395 249	3,672 353
Mining	7,013 100	6,154 88	1,721 30	2,614 37	3,946 68	2,040 29
Manufacturing	3,969 100	4,261 107	3,618 99	3,872 98	1,949 53	4,127 104
Electricty, Gas, Water	7,440 100	7,919 106	10,749 152	8,760 118	4,657 66	13,645 183
Construction	1,986 100	2,688 135	3,313 163	2,410 121	2,174 107	2,991 151
Transportation Communication	2,361 100	5,071 215	3,574 156	3,341 142	2,744 120	3,605 153
Commerce Service	2,516 100	3,872 154	3,528 144	3,417 136	2,137 87	3,123 124

Note: Upper figures in each category show real GDP per employee in Japanese yen of 1973
Lower figures show comparative values using 100 for Japan

Currency conversion based on purchasing power parity of GDP of 1973 computed by UN, or 1 dollar = 3.09 DM = 4.52 francs = 0.341 pound = 38.6 Belgian francs

Figure 2. Comparison of Labor Productivity Level by Industries of Advanced Nations (Japan = 100)



On the other hand, a comparison by standard value shows that the United States, which had the lowest growth rate, came out on top, and as of 1979, the United States surpassed Japan in overall industries by 1.57 times. Belgium (1.43 times over Japan), France (1.41 times) and West Germany (1.39 times) followed the United States closely. England alone was lower (95 percent of Japan), but in general, Japan's labor productivity level could not be termed high.

Japan is lowest in agriculture, forestry and fishery, showing a considerable gap from the other countries. The top ranking United States is four times higher than Japan.

Japan is highest in the mining industry, followed by the United States (88 percent of Japan) and England (68 percent of Japan), but the level of the other three countries is quite low.

The United States is 7 percent higher than Japan in the manufacturing industry; the other countries, with the exception of England (53 percent of Japan) are generally on the same level as Japan.

In the electric, gas and water service industries, Japan's productivity maintained the highest growth, but it is still low according to the standard value, showing considerable gaps as compared with Belgium (1.83 times over Japan) and West Germany (1.52 times).

West Germany has the highest growth in the construction industry (1.63 times over Japan) and Japan is the lowest.

Japan is also the lowest in the transportation and communications industries, and the United States is the highest, surpassing Japan by 2.15 times.

The United States maintained the highest growth in the commerce and service industries (1.54 times over Japan). Although Japan is higher than England, Japan shows a gap of about 40 percent compared with France and West Germany.

By and large, Japan has achieved the level of Western Europe in the mining industry, but with the exception of England, there is a considerable difference in other industries.

(Tables 3 and 4) Trend and Standard Value of Labor Productivity of Asian Countries

The labor productivity index (Table 3) based on 1973 as 100 shows that South Korea, with growth of 122.4, is the highest in overall industries for 1978 (1977 for the Philippines), followed by Japan with 112.4. A 10-percent gain for Pakistan, the Philippines and Singapore is seen, but Thailand's gain of 105.4 is very low.

The trend according to industries of each country shows that Japan had the greatest growth in mining (140.3) and in manufacturing (132.5), but dropped in agriculture, forestry, fishery, construction, transportation and communications.

Table 3. Labor Productivity Growth Rate of Asian Countries by Industry (1975 = 100)

Countries	Japan (1978)	S. Kor (1978)	Pakistan (1978)	Singapore (1978)	Philippines (1977)	Thailand (1978)
Overall industry	112.4	122.4	110.7	109.5	110.2	105.4
Agri, Forest, Fish	97.9	113.7	101.9	108.9	118.9	92.9
Mining	140.3	66.9	116.5	261.7	82.0	80.5
Manufacturing	132.5	123.8	107.0	107.5	107.3	135.4
Elec, Gas, Water	104.6	189.6	127.7	134.0	92.0	101.5
Construction	98.1	109.6	109.3	76.2	113.8	87.0
Transp, Commun.	99.9	111.6	116.7	136.6	92.7	128.0
Commerce, Service	106.5	110.2	111.3	108.3	97.9	101.3

Note: This table shows real GDP index per employee based on 1975 as 100

South Korea showed a large gain in manufacturing (123.8) and electric, gas and water (189.6), reflecting a rapid expansion of industrialization.

Singapore's growth of 107.5 in manufacturing is surprisingly low. The Philippines showed a slight gain in agriculture and construction, but it was sluggish in manufacturing and lower in other industries. Thailand gained largely in manufacturing (135.4) and transportation and communication (128.0), but remained stagnant in other areas.

From the standard value comparison (Table 4), Japan's level is overwhelmingly high. Singapore, in second place, is 64 percent of Japan based on overall industries, with South Korea at 20.5 percent, the Philippines at 11.6 percent, and Thailand and Pakistan are extremely low at less than 10 percent.

Standards by industries show that Singapore's growth of 1.5 times that of Japan in agriculture, forestry and fishery is an exception but Singapore still maintains relatively high level in other industries. But other countries remain at fairly low levels. The high level maintained by Singapore in agriculture is believed to be from the horticultural crops.

Table 4. Labor Productivity Growth Rate of Asian Countries by Industry (1975 = 100)

Countries	Japan (1978)	S. Korea (1978)	Pakistan (1978)	Singapore (1978)	Philippines (1977)	Thailand (1978)
Overall industry	3,187 100	652 20.5	206 6.5	2,060 64.6	357 11.6	240 7.5
Agr. For, Fish	1,204 100	324 26.9	100 8.3	1,829 151.9	206 17.3	90 7.6
Mining	6,807 100	1,047 15.4	1,046 15.4	4,661 68.5	1,340 25.3	3,061 45.0
Manufacturing	4.355 100	921 21.2	222 5.1	1,864 42.8	792 19.7	757 17.4
Elec, Gas Water	9,811 100	4,330 44.1	625 6.4	4.416 45.0	910 9.6	1,120 11.4
Construction	2.935 100	677 23.1	247 8.4	2.421 82.5	736 26.3	913 31.1
Transportation Communications	2.871 100	1,188 41.4	281 9.8	2.478 86.3	347 12.0	808 28.2
Commerce Service	3,346 100	765 22.9	324 9.7	2,028 60.6	381 11.7	543 16.2

Notes: Upper figures in 1,000 yen show real GDP per employee in Japanese yen of 1975

Lower figures show comparison using Japan = 100

Currency conversion based on 5 year average of exchange rates between 1973-1977: 100 yen = 157.9 won = 3,479 rupees = 0.8531 Singapore dollars = 2.50 pesos = 7,167 baht

(Table 5) Comparison of Labor Productivity by Types of Manufacturers in Japan and the United States

From the standpoint of man-hours, the difference in the value added labor productivity showed that the United States was 2.09 times greater than Japan in 1970, but it diminished to 1.38 times by 1980. This shows Japan's faster growth in productivity during this period. Despite Japan's rapid growth in productivity of manufacturers, the United States maintains a 38 percent higher level than Japan.

Table 5. Comparison Value-Added Labor Productivity of Japan-U.S. Manufacturing by Categories

	1970	1973	1978	1980 (est.)
Overall manufacturers	209	187	153	138
Foods	278	247	212	225
Textile	207	171	144	136
Clothing	217	220	246	259
Wood, wood products	185	231	153	137
Furniture, furnishings	147	171	168	n.a.
Pulp, paper, etc.	177	169	203	209
Publ, printing	169	202	217	n.a.
Chemicals	160	150	120	112
Oil, coal production	162	110	n.a.	n.a.
Rubber production	227	179	153	137
Leather production	158	171	193	200
Ceramics	213	179	162	155
Iron and steel	162	110	79	66
Nonferrous metals	114	123	150	142
Metal products	248	201	176	181
General machinery	191	190	141	128
Electrical equipment	236	182	124	105
Automobiles	238	206	121	99
Trans equip (except auto)	198	160	140	n.a.
Precision machinery	346	294	200	116
Other	258	237	187	n.a.

Note: Comparison made by calculating real rough-added value per person/hour using double deflation method from Japan-U.S. industrial statistics

Yen-dollar conversion based on 1973 exchange rate of $1 = 272.2 yen

According to the 1980 level by industries, Japan showed the highest growth in the iron and steel industry, while the United States remained at the level of 66 percent of Japan. In contrast, Japan is the lowest in the clothing industry (1:2.6 of the United States), with other industries falling in between.

The reason for Japan's higher level as compared with the United States is because of the automobile industry (U.S. level at 99 percent of Japan) in addition to the iron and steel industry, although the United States is higher in other types (of manufacturing). The types approaching the U.S. level are in electrical machinery (105 percent over Japan), chemical industry (112 percent), precision machinery (116 percent), general machinery (128 percent), etc. Among these, precision machinery, in which the United States led Japan by 3.46 times in 1970, has narrowed down to 1.16 times in 1980. The increase in Japan's productivity was spectacular during this period. On the other hand, there are types which show greater disparity between Japan and the United States since

1970, such as in the clothing industry, household furniture and furnishings, pulp-paper and paper processing equipment, printing and publishing, leather and leather products, nonferrous metals, etc.

As a whole, the level of traditional industries remained low and the productivity level of heavy chemicals and high industrial processing industries gained, and the latter have either reached or surpassed the level of the United States.

(Table 6) Comparison of Labor Productivity by Types, Japan-West Germany and Japan-England

Table 6. Comparison of Value Added Labor Productivity of Japan-West Germany and Japan-England by Categories

	W. Germ (1978)	England (1979)
Overall manufacturers	78	57
Foods	103	59
Textile	66	54
Clothing	117	102
Wood, wood products	110	60
Furniture, furnishings	118	84
Pulp-paper, etc.	93	62
Publ, Printing	55	—
Chemicals	60	52
Oil products	173	—
Rubber products	52	—
Leather, leather prod.	93	—
Ceramics	97	70
Iron and steel	73	20
Nonferrous	91	52
Metal products	69	64
General machinery	60	49
Electric equipment	77	46
Office equip, calcula.	119	—
Transport equip	—	25
(auto etc)	48	26
Precision study	75	65
Other	76	—

Notes: Comparison made by calculating the real rough added value per person at 1973 price using double deflation method from industrial statistics of various countries.

Conversion of yen-mark and yen-pound based on 1973 GDP purchasing power calculated by UN (1 DM = 83.2 yen, 1 pound = 754 yen).

Automobiles include two-wheel motorized vehicles and bicycles.

West Germany's level of value added labor productivity per person in 1978 was 78 per cent of that of Japan, and the level in England was 57 percent of Japan's in 1979. England, in particular, was quite low. According to the types of manufacturing in West Germany and England, some types have a higher productivity level than Japan, but most of them are lower.

England's level in all types of those surveyed is lower than that of West Germany.

The types of manufacturing in which Japan has higher productivity include the automobile industry (United States at 48 percent, England at 26 percent of Japan) and iron and steel works (73 percent for West Germany, 20 percent for England), indicating a very low level for England. Japan holds a high position in general machinery (60 percent for West Germany, 49 percent for England), chemicals (60 percent for West Germany, 52 percent for England) and electrical machinery (77 percent for West Germany, 46 percent for England).

Japan also maintains a fairly high position in the textile industry (66 percent for West Germany, 54 percent for England).

However, Japan is slightly lower in the clothing industry, with West Germany holding at 117 percent and England at 102 percent.

In general, it can be seen that Japan maintains a stronger position in the high processing and high value added types of industries.

9218
CSO: 8129/1669

SCIENCE AND TECHNOLOGY

ECONOMIC ASPECTS OF NUCLEAR ELECTRIC POWER GENERATION NOTED

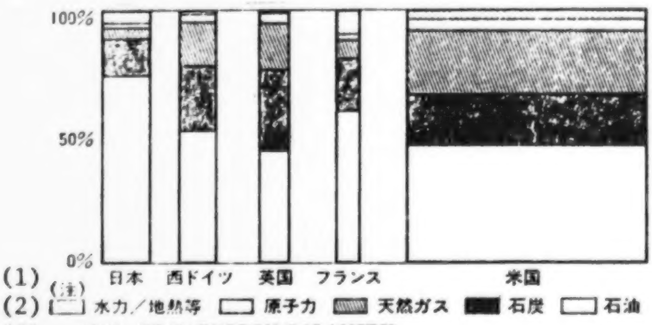
Tokyo ENERUGI FORAMU in Japanese No 329, Vol 28, May 82 pp 30-36

[Article by Horishi Takahashi:"Evaluation of Nuclear Electric Power Generation From the Standpoint of Economic Aspects"]

[Text] (1) The Position of Nuclear Power Generation

While our country's dependence on oil has been lower in recent years in terms of the overall energy supply structure, in 1980 we were still 66 percent dependent on oil and, as shown in Table 1-1, among the major advanced countries, we had the highest level of dependence. Furthermore, our nation's energy supply was 86 percent dependent on foreign sources, which was also the highest level among these nations for such dependence. With such a poor energy supply picture as a backdrop, in order for our country to assure for itself a stable energy situation, it is essential that we actively promote the development and introduction of alternative energy sources to oil. There are many excellent qualities attributable to nuclear energy, but here I would like to evaluate its economics from a broader vantage point, taking into consideration its economic security as well as its economic impact on society.

Table 1-1. Energy Supply Structure of Major Countries (1979)



(3) (資料：OECD ENERGY BALANCES)

Key:
(1) Japan West Germany Great Britain France United States
(2) Remarks: Hydroelectric/Geothermal Nuclear Energy Natural Gas Coal Oil
(3) Source: OECD Energy Balances

The foremost characteristic of nuclear energy is the stability of supply. Although nuclear fuel, like oil, is unvoidably dependent on supply from foreign sources, most of the supplier countries are politically stable, and at the same time the long-term availability of such supplies can be considered high in comparison to oil since we have concluded long-term purchase contracts with these countries. Also, in comparison with thermal electric power generation, very little nuclear fuel is required to produce an equal amount of electricity. Therefore, the merits of easier transportation and storage are also factors to be considered. Also, in nuclear electric power generation, once the fuel is loaded, there is no need to replace it for at least a year, which gives it another storage advantage.

In addition, when viewed in the long range in Japan, the establishment of an independent nuclear fuel cycle through reprocessing of spent nuclear fuel and the development and use of newer type reactors, nuclear electric power takes on the characteristics of being a semidomestic energy resource. If the fast breeder reactor is developed, the potential for use of uranium resources will take a quantum leap forward. Viewed in this manner, we can place nuclear power in the category of a long-range, stable energy resource.

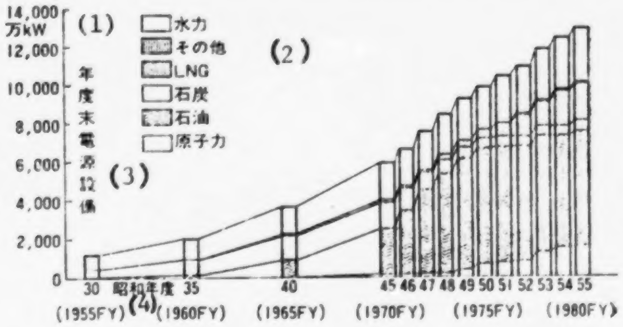
As a second major characteristic of nuclear power generation, compared with other forms of electrical supply, we can point to the fact that the per-unit cost is considerably lower. In other words, economical in the narrowest sense. The peaceful utilization of nuclear energy requires the highest degree of technological standards and presupposes the attainment of safety as a prime requisite. Therefore, many technical requirements are placed on its development in order to assure adequate safety measures, which in turn requires considerable cost. However, even when such costs are factored into the picture, when we compare nuclear power with other forms of power generation, we find that it can still be supplied at a considerably cheaper per-unit price. I will address this matter later in the article.

Third, it contributes to the advancement of industry and the economy. The nuclear electric power industry is a model of the high-technology intensive industrial system comprising electric power generation and its peripheral equipment industries, including nuclear fuel cycle related industries. We can anticipate that this will form the basis for upgrading our domestic industrial structure and contribute greatly to its development.

Fourth, there is the characteristic that nuclear electric power generation plants do cause repercussions and have an effect on the economy and social structure of the area in which the plants are located. The construction of a nuclear power facility affects a wide field of activity, including the population, employment, business and finances of a region, giving rise to a vigorous spirit of building in major local areas.

With these four major characteristics as a background, our nation's nuclear electric power generation, from the time our first commercial power generator unit went on line in 1966, as shown in Table 1-2, has steadily grown to the current level of 22 operating electric power plants with a 1,551-megawatt capacity. In 1980 electrical power provided by nuclear power generation reached

Table 1-2. Yearend Levels of Electric Power Capacities (commercial users)



Key:
(1) 10,000 kW
(2) Hydroelectric
Other
LNG
Coal
Oil
Nuclear
(3) Yearend power capacities
(4) Showa Year

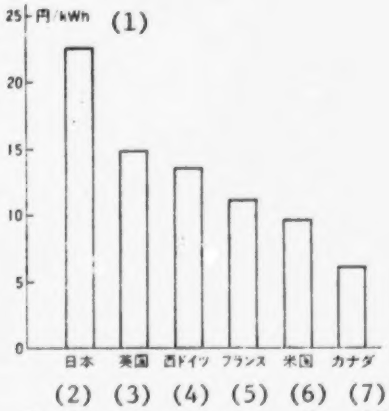
the level of approximately 82 billion kWh, or about 16 percent of the total electrical supply, thus assuring itself a firm place in the lifestyle of our nation.

(2) The Economic Efficiency of Nuclear Power in Japan

Now, with the question of external trade frictions a great topic in Japan, and with presentday electric power costs in Japan being among the highest among the world's major countries, our domestic industrial sector, particularly the basic raw materials handling industries which are the high-volume users of electrical power, have felt great repercussions and are confronted with many problems. Of course, in the future Japan must change the industrial structure in order to cope with the era of high energy costs, and at the same time it will still be necessary to promote energy conservation. It is a very important factor to actively try to hold down the rise of energy costs in general in the future, and in particular the cost of electric power. A comparisons of consumer electrical costs for the major countries of the world is given in Table 1-3.

Of course, in these comparisons we must take into account the differences in the pricing structures of the various countries as well as the differences resulting from monetary exchange rate fluctuations. However, generally speaking, I believe that Japan's electrical energy costs are in the highest categories. The difference in levels of electrical energy costs are the result of differences in the structuring of the energy production of each country, and, as shown in Table 1-4, we can see once again that having usable, plentiful and cheap domestic resources greatly contributes to the lowering of electrical energy cost levels.

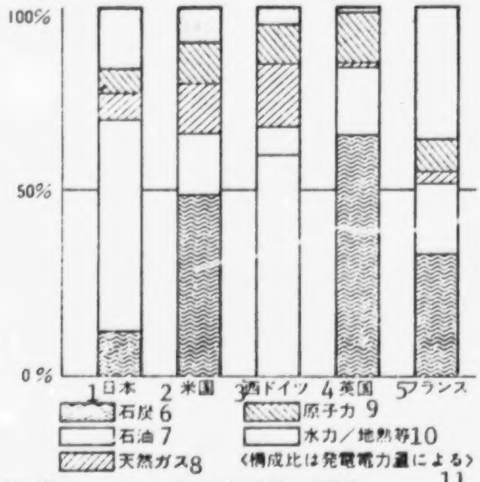
Table 1-3. Unit Consumer Cost Comparison of Major Countires (1980)



Note: Canada figures are for 1979

Key:
(1) Yen/kWh
(2) Japan
(3) Great Britain
(4) West Germany
(5) France
(6) United States
(7) Canada

Table 1-4. Types of Fuel Used for Power Generation by Major Countries (1979)



(12資料：OECD ENERGY BALANCES)

Key:
(1) Japan
(2) United States
(3) West Germany
(4) Great Britain
(5) France
(6) Coal
(7) Oil
(8) Natural gas
(9) Nuclear
(10) Hydroelectric/geothermal
(11) (Comparisons based on volume of power produced)
(12) Source:

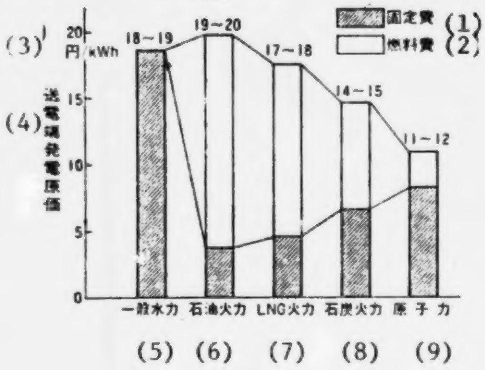
By constrast, for Japan, which has virtually no domestic energy resources, if we were to take away nuclear electric power we would have left mainly coal and LNG in the short run as alternative energy sources to oil. We would therefore still be dependent on foreign sources of fossil fuels. This situation would not change even for the medium term outlook. In other words, if we were to consider the insecurity of price spirals of coal and LNG import prices as contingent rises following the upward costs of oil, then as far as Japan is concerned, nuclear electric power generation can be considered as contributing more toward the stabilizing of energy costs than in other countries of the world.

Regarding Nuclear Electric Power Generation Costs

(1) Cost of Electric Power Generation and Nuclear Energy

In order to get a better grasp of the economic efficiency of nuclear electric power generation we used the Energy Resources Agency's estimated model prices and compared the power generation costs by different energy sources. As Table 2-1 shows, in electric power generation plants which started operation in 1981, their first-year production costs at the supply point were 11-12 yen per kWh for nuclear energy, 14-15 yen per kWh for coal-fired energy, 17-18 yen per kWh for LNG energy, and 19-20 yen for oil energy. Nuclear energy can easily be seen to be far superior as an alternative energy source compared to oil.

Table 2-1. Cost of Energy From Different Sources (facilities started in 1981)

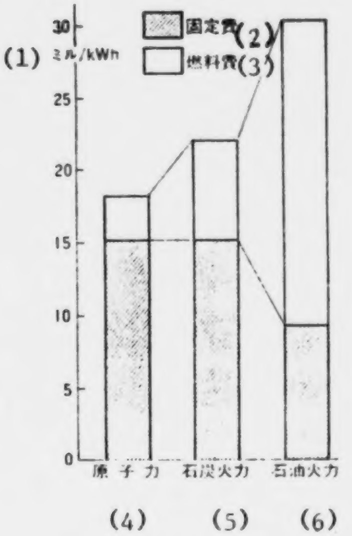


Key:

(1)	Fixed costs	(6)	Oil
(2)	Fuel costs	(7)	LNG
(3)	Yen/kWh	(8)	Coal
(4)	Cost at supply point	(9)	Nuclear
(5)	Hydroelectric		

Table 2-2 and Table 2-3 provide a comparison of energy costs by types of fuel in the United States and France, and the same trends are observable.

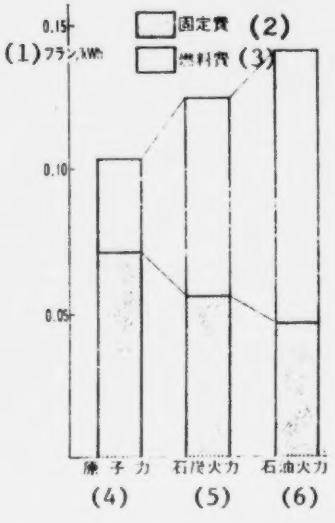
Table 2-2. Electrical Costs for Base Loading Generating Plants in the United States (to start operation in 1985)



Key:
(1) Yen/kWh
(2) Fixed costs
(3) Fuel costs
(4) Nuclear
(5) Coal
(6) Oil

Source: FEA National Energy Outlook (1976)

Table 2-3. Average Electrical Costs for Base Loading Generating Plants in France (to start operation in 1990; 1978 costs)

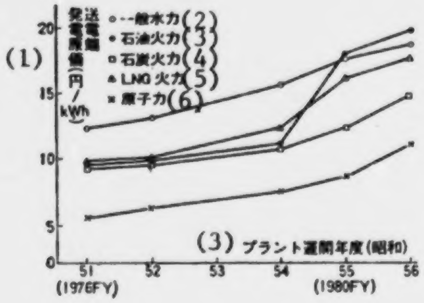


Key:
(1) Franc/kWh
(2) Fixed costs
(3) Fuel costs
(4) Nuclear
(5) Coal
(6) Oil

Source: French Electrical Ministry (1978)

The trend as seen in Japan, particularly as shown in Table 2-4, has developed as an aftereffect of the second oil shock.

Table 2-4. Trends in Electrical Production Costs in Recent Years (based on estimates)

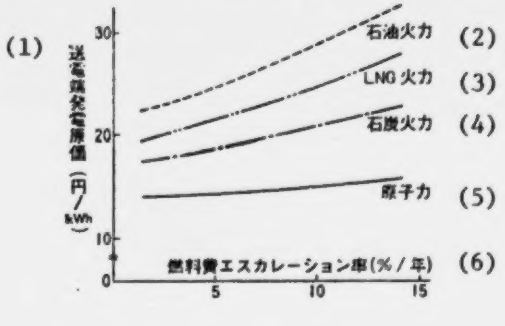


Key:

(1)	Cost at point of supply (yen/kWh)	(5)	LNG
(2)	Hydroelectric	(6)	Nuclear
(3)	Oil	(7)	Year of plant operation (Showa)
(4)	Coal		

In other words, with oil prices more than doubling in 2 years, as a cause and effect of this, the cost of LNG and coal showed an upward trend. In those areas where fuel costs held a major share in the pricing of electrical energy production, the costs were reflected immediately in a rising cost of the energy produced. As a result of this the fuel cost factor with regard to the energy production unit costs for the various methods of electrical power generation is ever increasing, as shown in Table 2-1 earlier. Using the model estimated prices, the fuel cost factor is 25 percent for nuclear energy, 80 percent for oil, 75 percent for LNG, and about 55 percent for coal. As Table 2-5 indicates, nuclear fuel related cost increases are generally very minimal in relation to the rising unit cost of other forms of energy production. Therefore, for a country like Japan, which is entirely dependent on foreign resources for its primary energy needs, it is particularly appealing.

Table 2-5. Comparison of Rising Unit Costs and Fuel Costs in Various Forms of Electric Power Generation (base projection to 1985 startups)



Key:

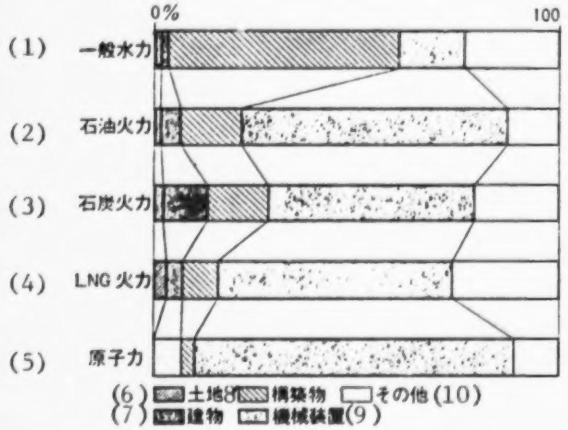
(1)	Unit cost at point of supply	(4)	Coal
(2)	Oil	(5)	Nuclear
(3)	LNG	(6)	Percentage of escalation of fuel costs (percent/year)

However, conversely, in terms of capital cost increases, the weight factor for capital outlay requirements per unit cost of generating nuclear electric power is a major negative influence. A major cause of this increase in capital requirements is directly related to the high cost of construction of nuclear facilities and the lower rate of operation.

With regard to the first point, the extremely long construction time involved results in a ballooning of interest costs during this period. Today, in Japan, although there are exceptions, nuclear electric power generation facilities usually require about 6 years to complete, so, compared with a normal thermal plant which can be built in 3-4 years, the effect that interest payments have on capital is great. Therefore, it is important that efforts be made for the standardization of equipment and the improvement of construction methods in order to shorten the construction period.

Second, in the case of a nuclear electric power generating plant, as Table 2-6 indicates, the weight factor for the cost of equipment is extremely high. Therefore, it is desirable to counter this by increasing safety and reliability while at the same time moving toward standardization within the plant.

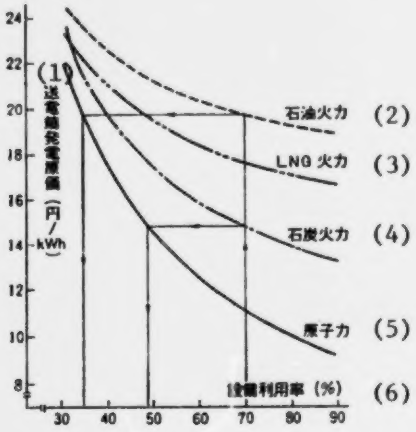
Table 2-6. Unit Cost Percentages for Various Forms of Energy Generation



Key:			
(1)	Hydroelectric	(6)	Land cost
(2)	Oil	(7)	Building cost
(3)	Coal	(8)	Structures cost
(4)	LNG	(9)	Machinery/equipment cost
(5)	Nuclear	(10)	Other

On the other hand, the relationship between operating rate and power production cost is as shown in Table 2-7.

Table 2-7. Relationship Between Unit Power Cost and the Operating Rate for Various Types of Energy Production (plants which began operation in 1981)



Key:

(1) Unit cost at point of supply
(2) Oil
(3) LNG
(4) Coal
(5) Nuclear
(6) Use of facilities (percent)

In our country the operational utilization of nuclear electric power generating plants was 61.7 percent in 1981, which was the second year running in which we attained a record of more than 60 percent utilization of such facilities. It can be said that our country, which generally conducts detailed inspections over a 3-4 month period, has an exceptionally good performance record.

(2) Backend Expenses and the Cost of Energy Generation

In recent years there has been a rising interest in backend expenses related to the economic efficiency of nuclear electric power generation. The argument surrounding this issue is whether there is still economic efficiency when backend expenses are factored into the cost. Examples of backend expenses that can be readily cited are: the expenses of transporting and reprocessing of spent nuclear fuel emanating from a nuclear power facility, the expenses of disposal of reactors after their useful life is past, and the costs of disposal/disposition of high and low level radiation emitting materials.

As for backend expenses with regard to reprocessing costs, we are able to determine accurate figures due to the track record established through the operations of the Fuel Transport Corporation and the Tokai reprocessing facility as well as through the reprocessing already consigned to British and French reprocessors. In other words, these reprocessing expenses, which include the freight costs to the reprocessing facility and the glass-sealed disposal of high radiation liquids from the reprocessing, have all been integrated into the per-unit cost for the production of nuclear electric energy, and this is estimated to be about 1 yen/kWh.

At present it is difficult to make an accurate estimate on other backend expenses. At this time low radioactive pollutants are being stored under safe conditions within the confines of the power plants, and it is possible for this storage situation to be extended for a considerable time. However, in the future, it is planned to follow the basic policies determined by the Nuclear Energy Commission, and disposition will include both land and sea disposal. The preparations for acquisition of appropriate areas are currently underway. In order to make accurate estimates of these costs in the future it is necessary to decide the proportions for sea and land disposal, and detailed estimates must be made for building the required facilities for land disposal. As progress is made in this type of preparatory work, the related costs will become more clearly focused.

It can be said that the cost estimates for the storage and disposal of high level radioactive materials, when compared to low level radioactive materials, are much more complex.

The high level radioactive materials resulting from reprocessing are glass sealed and must be stored for several decades in order to lower the radiation levels and the heat. Final disposition as planned will be for burial at a depth of 1,000 meters underground.

The glass sealing expenses are a known factor and accurate estimates can be derived so, as explained earlier, these are always included in costing figures, but with respect to storage and ultimate disposition, the problem is now being studied vigorously from a long-range point of view by the Fuel Transport Corporation and the Japan Nuclear Energy Research Institute. It is expected that more time will be required for specific recommendations to be forthcoming.

Because of this, for purposes of this article, I would like to introduce estimate examples for costs related to disposal of materials worked out by the working group of the International Nuclear Fuel Cycle Evaluation Committee (INFCE). This is a case study wherein costs were derived by estimating the cost of nuclear waste materials derived at all stages of the nuclear fuel cycle; after total costs were computed, the per-unit output costs were estimated. However, these estimates are based on a case study in which the low and high radiation level waste materials coming from a nuclear plant were disposed of in bedrock and they cannot be said to be applicable to the radioactive waste disposal program of our country. It is, however, one of the few concrete examples of cost estimates for this problem. According to this report, the cost of disposing of radioactive waste material, including both the low level radioactive material from the generating plant and the radioactive debris from the reprocessing is estimated at 25-30 sen per kWh.

As stated previously, it would probably be difficult to apply this directly to our country's situation, but it is understandable that the cost of disposing of radioactive materials is not a terribly big factor.

Next, let us take up the question of reactor shutdowns. Even the oldest of the nuclear electric generating plants in our country has been in operation only about 10 years, so the question of their ultimate disposition is not one that will confront us in the near future. However, it is important to have a clear idea of how a shutdown reactor is to be safely and permanently disposed of, so this question has come to be of rising concern in recent times.

There are three ways plus a combination of any of these ways to tackle the problem of the shutdown of a reactor: 1) sealed custody method; 2) shielded isolation method; and 3) dismantling method.

This type of reactor shutdown procedure has many precedents, albeit minor in scope, in the nuclear energy advanced countries, so there is a store in technology in this regard. In the United States, there is experience in having closed down 6 nuclear electric power generators, 4 operational reactors, 6 experimental reactors and 50 research reactors. Great Britain, France, West Germany and Sweden also have close down reactors. We also have experience in closing down research reactors, so this technology, it is believed, can be applied to the closing down of high volume nuclear electric power generating reactors.

In this manner, it is conceivable that present day technology is sufficient for coping with the shutting down of a reactor. However, the government, in order to further assure safety and with a view to maximum economic efficiency, as well as leaving the site of the closed down reactor suitable for continued use as a nuclear power generating facility, is pursuing the development of reactor shutdown technology and related matters.

With regard to the shutting down of a reactor, the type of shutdown method, are preconditions that allow for a great deal of latitude in estimating costs. According to estimations by foreign countries, the immediate dismantling method of closing down a reactor runs from a few percent to 20 percent of the construction cost of the reactor facility.

From these factors it is difficult to arrive at a definitive evaluation of the cost of closing down a reactor, but it is believed that it will be in the neighborhood of 10 percent of the electric power generation costs.

The Economic Effectiveness of Nuclear Energy Development, Etc.

(1) The Regional Economic Effect Contingent on Nuclear Development

While blessed with a beautiful and bountiful natural environment, regional progress has left the towns and villages as pockets of backwardness in basic preparedness. To such areas, what kind of economic effectiveness does the establishment of a nuclear electric power plant offer?

Of course, concurrent with the setting up of a nuclear electric energy plant, the prime concern is the attainment of safety and preservation of the environment. But also it is a certainty that the plant's existence will have varied effects on the local economy and society; in other words, the region's finances, employment and business will all be affected. Let us review some specific examples.

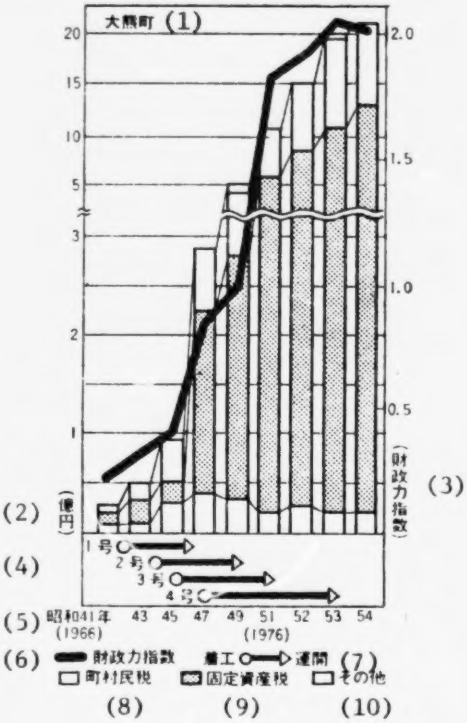
A) Contributions to the Finances of the Local Economy

As a direct effect on the finances of the local economy, under the provisions of the three laws relating to power generation, the local village, town or city (including neighboring entities) receive grants from the Electrical Power Establishment Promotion Countermeasures Fund starting from the inception of construction to 5 years after completion of construction. This grant is used for the maintenance of public properties in the affected areas. Starting in 1982 it is anticipated that this grant fund will also be used for the maintenance of commercial promotion facilities such as industrial canals and industrial parks.

This Electrical Power Establishment Promotion Countermeasures Fund grant to the local body where a nuclear power facility of say, 1 million kWh is to be built, will be in the amount of 3.15 billion yen. Neighboring towns and villages will also receive an equal amount, for a total of 6.3 billion yen in grants. It goes without saying that with the start of construction the population will increase as well as the number of related businesses that will move into the area, thus giving the local autonomous body a bigger tax base and therefore a larger income.

Next, when the power plant is completed, the real estate taxes derived from the facility form a large source of funds for the local body, paving the way for it to become fiscally independent. Table 3-1 shows a representative growth pattern of financial revenues for local towns and villages where nuclear power facilities exist. The sudden rise of financial strength indicators (financial requirements to average tax revenues) is shown from the time the power plant construction began through the time it went on line.

Table 3-1. Town and Village Tax Revenues and the Trend of Financial Strength Indicators



Key:
(1) Okuma Town
(2) 100 million yen
(3) (Financial strength indicator)
(4) No 1, No 2, No 3, No 4
(5) Showa (1966)
(6) Financial strength indicator
(7) Construction start--------On line
(8) Town/village resident's tax
(9) Real estate tax
(10) Other

B) Effect on Employment

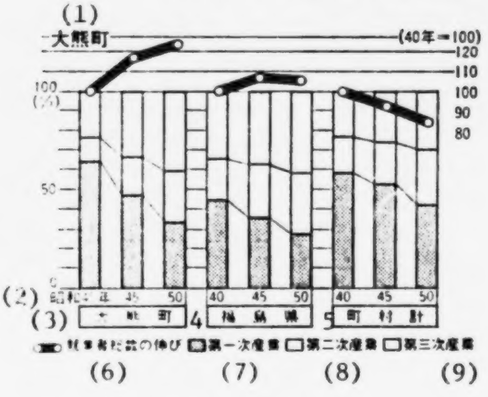
Normally, the construction of a nuclear electric power facility requires about 6 years to complete. During this period, although subject to the size and site requirements of the plant, an average of 2,000-3,000 persons per unit are required. In the case of the Fukushima No 2 Power Plant, where four units were under construction at the same time, upwards of 10,000 persons were employed.

Also, the daily spending of people peripherally concerned with the plant construction in such fields as material and machinery procurement adds to the employment prospects in the local area while giving the area a look of prosperity. After the power plant goes on line, besides the regular employment opportunities provided to operate it, many people are given work of a temporary nature when annual inspections of the plant are made. In particular, at the plants where more than one unit is in operation, if the inspections are scheduled in sequence, high employment is almost a normal state.

Also, aside from these high employment benefits, since 1981 incorporated into the three laws relating to power generation has been a special grant fund for power generation establishment countermeasures; its funds are allocated to local bodies to promote employment activities. As one facet of this program, with regard to prefectures that export electricity, the nation, depending on the volume of electricity exported, provides grants ranging from 50 million yen to 400 million yen. The purpose of part of these grants is to provide low-interest long-term capital investment loans to local concerns wishing to start new businesses in the area.

Table 3-2 shows the increase in employed individuals and that the establishment of a nuclear electric power plant contributes greatly to the increase in employment.

Table 3-2. Overall Employment Compared to the Employment Structuring in Various Industries



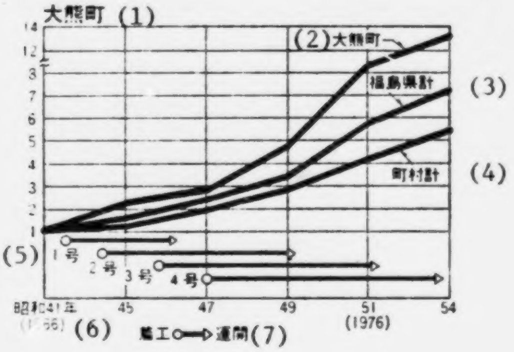
Key:
(1) Okuma town
(2) Showa Year
(3) Okuma Town
(4) Fukushima Prefecture
(5) Town/village total
(6) Growth of overall employment
(7) Primary industries
(8) Secondary industries
(9) Tertiary industries

C) The Vitalization of Business

When the construction of a power plant begins, many workers and people affiliated with the plant come to the town or village and its environs. Because of this, in addition to the vitalization of the flow of retail trade to accommodate the daily needs of these people, the construction needs of the power facility itself in terms of materiel and supply purchases are made locally, so by both direct and indirect means the local business community is favored with a great vitalization.

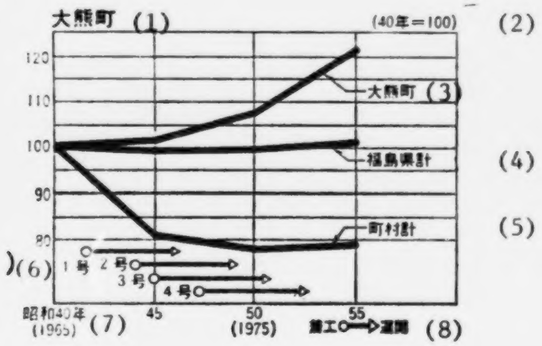
Table 3-3 shows the business sales volume trends of areas where nuclear electric power facilities are located; it is evident that in such areas the business sales volume is higher than the average increases in other parts of the prefecture.

Table 3-3. Trends in Business Sales Volume.



Key: (1) Okuma Town
(2) Okuma Town
(3) Fukushima Prefecture
(4) Town/village total
(5) No 1, No 2, No 3, No 4
(6) Showa Year (1966)
(7) Construction start---operational

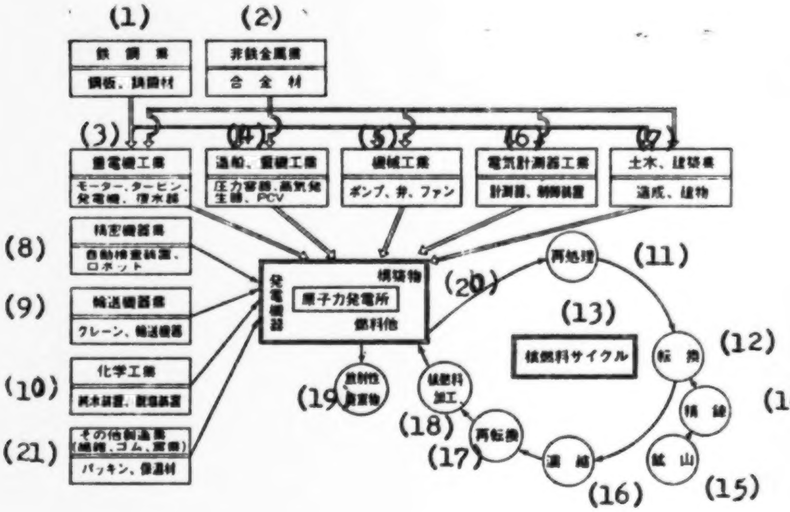
Table 3-4. Population Trends



Key: (1) Okuma Town
(2) (Showa Year 40 = 100)
(3) Okuma Town
(4) Fukushima Prefecture
(5) Town/village total
(6) No 1, No 2, No 3, No 4
(7) Showa Year
(8) Construction start---operational

In this manner, as has been said previously, the establishment of a nuclear electric power generating facility greatly contributes to the enhancement of the local and regional economy. From the standpoint of the government, all aspects of administration, including enactment of the three laws relative to electrical power and the tax system, were given due consideration and these results as well as other statistical data attest to the validity of this thesis.

Table 3-5. Nuclear Energy Industries Associated With Nuclear Electric Power Generation


(1)
鉄鋼業
鋼板、鋳鍛材
(2)
非鉄金属業
合金材
(3)
重電機工業
モーター、タービン、発電機、復水器
(4)
造船、重機工業
圧力容器、蒸気発生器、PCV
(5)
機械工業
ポンプ、弁、ファン
(6)
電気計測器工業
計測器、制御装置
(7)
土木、建築業
造成、建物
(8)
精密機器業
自動検査装置、ロボット
(9)
輸送機器業
クレーン、輸送機器
(10)
化学工業
純水装置、脱塩装置
(21)
その他製造業（繊維、ゴム、窯業）
パッキン、保温材
発電機器
構築物
原子力発電所
燃料他
(20)
再処理
(11)
(13)
核燃料サイクル
転換
(12)
精錬
(14)
鉱山
(15)
濃縮
(16)
再転換
(17)
核燃料加工
(18)
放射性廃棄物
(19)

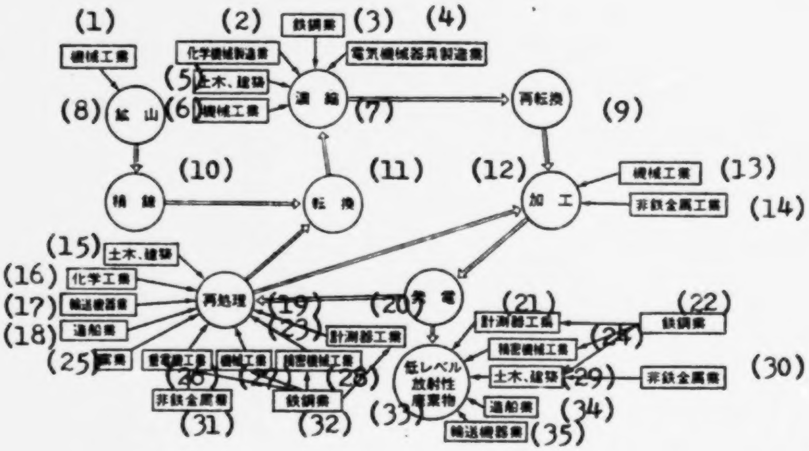
Key:

(1) Iron and Steel Industry
Steel plats, tempered castings
(2) Nonferrous Metals Industry
Alloys
(3) Heavy Electrical Machinery Industry
Motors, turbines, generators, condensors
(4) Shipbuilding, Heavy Equipment Industry
High pressure containers, heat exchangers, PCV
(5) Machinery Industry
Pumps, valves, fans
(6) Electrical Instruments Industry
Instruments, control equipment
(7) Civil, Construction Industry
Reclamation, buildings
(8) Precision Instruments Industry
Automatic inspection equipment, robots
(9) Transport Equipment Industry
Cranes, transport equipment
(10) Chemical Industry
Water purifiers, desalinization equipment

(11) Reprocessing
(12) Conversion
(13) Nuclear fuel cycle
(14) Refining
(15) Mining
(16) Enrichment
(17) Reconversion
(18) Nuclear fuel production
(19) Radioactive waste material
(20) Nuclear Power Plant
Electric Generators
Construction materials
Fuels/etc
(21) Other Manufacturing Industries (textiles, rubber)

Packing, gaskets, insulation

Table 3-6. Nuclear Energy Industries Associated With the Nuclear Fuel Cycle


(1)
機械工業
(2)
化学機械製造業
(3)
鉄鋼業
(4)
電気機械器具製造業
(5)
土木、建築
(6)
機械工業
(7)
濃縮
(8)
鉱山
(9)
再転換
(10)
精錬
(11)
転換
(12)
加工
(13)
機械工業
(14)
非鉄金属工業
(15)
土木、建築
(16)
化学工業
(17)
輸送機器業
(18)
造船業
(19)
再処理
(20)
発電
(21)
計測器工業
(22)
鉄鋼業
(23)
計測器工業
(24)
精密機械工業
(25)
窯業
(26)
重電機工業
(27)
機械工業
(28)
精密機械工業
(29)
土木、建築
(30)
非鉄金属業
(31)
非鉄金属業
(32)
鉄鋼業
(33)
低レベル放射性廃棄物
(34)
造船業
(35)
輸送機器業

Key:

(1)	Machinery Industry
(2)	Chemical Equipment Industry
(3)	Iron and Steel Industry
(4)	Electrical Equipment Industry
(5)	Civil/Construction Industry
(6)	Machinery Industry
(7)	Enrichment
(8)	Mining
(9)	Reconversion
(10)	Refining
(11)	Conversion
(12)	Production
(13)	Machinery Industry
(14)	Nonferrous Metals Industry
(15)	Civil/Construction Industry
(16)	Chemical Industry
(17)	Transport Equipment Industry
(18)	Shipbuilding Industry
(19)	Reprocessing
(20)	Generation of Power
(21)	Measuring Instruments Industry
(22)	Iron and Steel Industry
(23)	Measuring Instruments Industry
(24)	Precision Machinery Industry
(25)	Kiln Industry
(26)	Heavy Electrical Machinery Industry
(27)	Machinery Industry
(28)	Precision Machinery Industry
(29)	Civil/Construction Industry
(30)	Nonferrous Metals Industry
(31)	Nonferrous Metals Industry
(32)	Iron and Steel Industry
(33)	Low Level Radioactive Wastes
(34)	Shipbuilding Industry
(35)	Transport Equipment Industry

(2) Development of Nuclear Energy and Its Contribution to the Industrial Economy

In order to further nuclear power generation it is important to promote the advancement of the nuclear energy industry which forms its basis. Then, what is the nuclear energy industry? Specifically it is comprised of: 1) industries producing the nuclear power generating machinery; and 2) industries concerned with the nuclear fuel cycle such as enrichment, production and reprocessing of spent nuclear fuel. As can be seen in Table 3-6, they are almost all high technology industries related to general industry.

Of prime concern to the nuclear energy industry is for the nuclear energy equipment industry to overcome its accumulated deficits and to make its management sound. According to a study by the Japan Nuclear Industries Council, 1980 sales are reported to be about 500 billion yen, but this is expected to increase in the future.

Next, with respect to the manufacturing capacity for nuclear power generation equipment, it is said to be in the neighborhood of 6 million kilowatts. Our domestic capability is said to be more than 90 percent of this figure. In the future, based on our own technology, and, along with safety, we must strive to increase reliability and operating efficiency even more.

Third, with respect to the nuclear fuel cycle, with the exception of a part, we are reliant on foreign countries. However, our own research results are gradually beginning to have an impact, and these results are close to being put to commercial use. Even from the standpoint of becoming self-sufficient in the nuclear fuel cycle, the nuclear energy industry has a major role to play.

Next, to give commercial nuclear industrial activity its own characteristic indexes, we use figures for nuclear energy research investment. In 1980, according to the Japan Nuclear Industry Council, the research investment total was 6.4 percent of capital, which in comparison to general industry's 1.6 percent is at a considerably higher level. (Space industries in 1979 spent 3.3 percent on research.) Because of this level of R&D investment, current profit levels are not great, but on the other hand, it can be said that the foundations are being laid for future expansion.

In addition, in the future, with the sustained upgrading of our technology and the strengthening of the structure of our nuclear energy industry, we can look forward to the export of nuclear equipment parts and eventually to the export of nuclear electric generation plants themselves.

In this manner, we can contribute to the world's development of energy alternatives to oil and in particular we can play a big role in economic assistance to oil-deficient countries in the form of providing stable energy sources.

In any event, nuclear energy related exports must take into full consideration nuclear nonproliferation and the management of high technology. There are many problems unique to nuclear energy not evident in other types of plant exports.

Finally, with respect to nuclear energy production, whereas heretofore all of the effort by our country has been in increasing safety, it is gratifying that we have reached a point in the development where we can discuss its economic efficiency. However, we must never forget that economic efficiency exists only because safety is present, so we must constantly strive to upgrade safety and reliability.

Takahashi Hiroshi, councilor, Secretariat of the Energy Resources Agency.

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POLITICAL AND SOCIOLOGICAL

LIKELIHOOD OF JSP CHAIRMAN ASUKATA'S OUSTER ANALYZED

Tokyo SENTAKU in Japanese Aug 82 pp 54-56

[Text] The story goes back to June of this year. Ichio Asukata, chairman of the JSP, held a private talk with Akira Iwai, former secretary general of Sohyo. Iwai is the man who denounced the present Sohyo alignment of Makieda-Tomizuka as "tilting to the right," and as a result, he is now partially forbidden from visiting the party. However, he still maintains a latent power within the Kyokai (Socialist Society), an extreme left faction of the JSP. He is looked upon as one of the members to head the Kyokai in the event something happens to Itsuro Mukaizaka. Furthermore considering that Kyokai is the main body which supports Asukata, then we can understand the significance of the talk between the two.

"Serious Remark" Revealed to Akira Iwai

Asukata made a grave statement at the meeting. He said: "We must deliberate on personnel matters, including myself, at the party conference in December of this year." "Including myself" in effect means that Asukata may resign in the midst of his term of office, or at least it suggests such a possibility. Iwai, taken by surprise, reported that to "A," a confidant and a leading Diet member, and asked for confirmation of this possibility. "A," who tends to be mischievous, called "P," a reporter of a daily newspaper, and divulged the talk between Asukata and Iwai by saying at the outset: "The fact is that I heard this from reporter "Q" of a news agency." Within a short time, Nariyuki Funabashi of the JSP Central Executive Committee went storming into the JSP Press Club. An observer said he went directly to "Q" and told him in a furious voice: "Asukata has never mentioned personally his resignation." Funabashi is the person Asukata brought from Yokohama to be designated as a member of the Central Executive Committee. He is considered within the party as a secretary to Asukata.

Regardless of what Funabashi says, Iwai heard it directly from Asukata. It is natural that Asukata's statement spread rapidly within the party. However, reactions to the statement vary, from the majority, who think that "He is very obstinate--maybe its a trial balloon," to "It is Asukata's favorite political ploy," and to a dismayed group who say, "Oh? The scheme must have leaked out."

The names of those who were dismayed will not be given here, but a steady maneuver to demote Asukata was being carried out by them. They were flustered because Asukata, who would not dream of resigning without a drastic reason, made a statement which could be interpreted to mean a resignation yet not a resignation to Iwai of Kyokai. They took it to mean that Asukata perceived the plot to demote him and undertook a strategy of self-sacrifice to squash the plot.

Be that as it may, there are many points in this plot which differ from other plans to demote Asukata. First, rather than being led by the anti-Asukata rightwingers, the main force is centered on left and neutral elements. Second, the plan came out at the time a sign of inter-party agitation appeared. Third, the post-Asukata structure within the party is now occupied mainly by the Masahi Ishibashi faction.

The plan of the "plotters" is to have Asukata resign at the party conference in December and move him to the national constituency for the House of Councilors election of next year. His election would be assured since he would be ranked first in the "binding list" under the new system. This would save his face, but if he should decide beforehand to enter the Tokyo gubernatorial election, that would be all right too and he could go ahead and become a candidate. It is doubtful, however, that Asukata would be successful in the First District of Tokyo, which is Asukata's electoral district, due to a growing anti-Asukata atmosphere with the resignation of Kiyomasa Kato, who considers that he was dragged down by Asukata, as head of Chiyoda-ku (ward). It is also said that if Asukata failed to win the party leadership, the damage would not be limited to Asukata alone but it would inflict mortal wound to the entire party.

Who will bell the "cat" is the most essential part of the plot to demote Asukata. Under the present plan, several talks will be conducted by Masahiro Yamamoto of the leftwing Kyokai, Sukio Iwatare of Kyusangatsukai (Old March Society), Takatoshi Fujita of the rightwing Shaken (Socialist Study Association) and Tsuruo Yamaguchi of Seikoken (Administrative Concept Study Association). They will study definite plans to demote Asukata and formulate an encirclement net made up of various factions of the party.

Asukata has no objection to Seikoken, but he holds certain feelings toward the other three groups. In the final analysis, a sign of reorganization has appeared among the former leftist camps known as Kyokai, Kyusangatsukai and Shaken, and they are now entwined in the move to demote Asukata.

Sign of Reorganization in Former Leftist Camps

Beginning with Kyokai, many party Diet members, members of the Secretariat and students know that one cannot survive a day by following the Kyokai's dogma that all is right with the Soviet Union. It causes estrangement from the central headquarters and contradictions appear. On the other hand, many local Kyokai members are serious-minded and tend to listen more to the central headquarters. To them, the Diet members appear corrupt.

Complaints against them are made. The younger Kyokai members are criticizing Diet member Masahiro Yamamoto as "being too soft." And 80 percent of the full-time activists doing thankless jobs such as distributing the central organ's publications are young members and affiliated members of the Kyokai. Thus, any rebellion arising from them can be frightening for the party.

An altered view "to have the Kyokai devote itself to being a true theoretical group" has become stronger among the leftist factions because, if they are ignored, a proper reorganization cannot be made. To put it plainly, they are saying that politics should be entrusted to the Kyusangatsukai, and moreover, that they should be given a "free hand."

Shaken began to squirm around as if to act in concert with the move of Kyokai-Kyusangatsukai. As is known, this is the former Sasaki faction. This faction is labeled "rightist" now. It was once a leftist group which prided itself on tradition and quality. During the midst of the PRC-Soviet confrontation, the faction took a pro-PRC and anti-Soviet stand and joined the Seikoken in opposition to the Kyokai. In looking back, practially all of the principal members of Kyokai and Kyusangatsukai were once members of Shaken. They are fraternal brothers.

The downfall of Shaken is pitiful. With the defeat of Shoichi Shimodaira in the election for party chairman and the shift of devoted pro-China members who could no longer support China's upheaval, publication of its organ SHINRO was discontinued. A resumption of this publication was being sought for various reasons. As a result, the slogan "New Age Faction" emerged. A decisive self-criticism was made at the national conference of Shaken held in September at Atami "to recognize candidly that the insufficient theoretical elucidation on the question of who is the main enemy between the United States and the Soviet Union hegemony, the change in evaluation of the Great Cultural Revolution in China, the failure of left extremism of the Pol Pot regime, and the weak analysis regarding imperialism and modern capitalism has put a brake on the Shaken movement."

Kyokai was perplexed by the series of Soviet barbaric actions such as the invastion of Afghanistan. Shaken also fluttered around in regard to the instability of China and would not say that "both Russia and America are equally wrong" when the Reagan administration came out with its arrogant military expansion line. Such pitching and rolling of the JSP leftist camp can only be regarded as comic, but going back to what I was saying, these situations are why a reorganization of the leftist camp can be anticipated.

It is strange, but Shaken has appeared to maintain that in actuality Asukata will do as a chairman even though Shimodaira is a possible candidate for the chairmanship. In a situation where there is no actual candidate, there is no intention of leading the way to oust Asukata. Rather, Shaken detests Ishibashi. If Ishibashi were to become the chairman, Seikoken would have one of its members serve as chief secretary, which would leave Shaken with no chance to participate. This is what it fears.

This anxiety hit the mark in July. It did not involve major positions such as that of chief secretary, but the position of chief of the General Affairs Department of the General Affairs Bureau, an important post in the party Secretariat, went to Shaken's former Katsumata faction; in other words, to a person affilitated with Ishibashi. Seikoken, which was supposed to be a sworn friend, feigned indifference. Moreover, one of the persons who brought the subject of a reshuffle to Ishibashi was from Seikoken. Anticipating that Ishibashi will be the next chariman, more and more members are trying not to miss the bus.

Shaken is aware of this and does not want to take an isolated road. It appears that it will be represented in the four-man meeting to oust Asukata.

What about Kyokai? It unanimously takes the position that it is not necessary to oppose Asukata. Kyokai's general line, "Ishibashi next," has not changed. This is the line Mukaizaka advocated earlier. The rest is timing, and if an opportunity can be seized, Asukata's downfall can be effected speedily.

Ishibashi is watching these situations very patiently. But sources close by are saying that he is no longer hiding his criticism of Asukata. Masahiro Yamamoto of Kyokai cautioned Ishibashi about becoming excessive in his criticism: "Please moderate your criticism against Asukata. If you criticize too harsly, the task will become difficult." It continues to be an abdication without creating a storm, but one of the members who is trying to oust Asukata said: "It does not make any difference when we come this far. We are thinking of having Ishibashi attend the factional cross-section meeting."

"Replacement" Ishibashi Eagerly Watching

Ishibashi is dissatisfied with Asukata because he is avoiding a heart-to-heart talk with him. Asukata pretended ignorance on the important personnel matters, although he agreed with Makieda of Sohyo. In addition, Ishibashi is dissatisfied with the politically tone-deaf statements and actions of Asukata. On 19 July, Asukata came out with the proud posture that "I will fight to the utmost for the Socialist proposal at the lower house level" in reference to the revision of the Public Officers Election Act (reform of House of Councilors national constituency) during the meeting of the Committee for JSP-Sohyo Cooperation. However, it is absurd if Asukata believes earnestly that the revision can be made. Regarding timeliness, approval can be very delicate. Even if a revision is approved by the Lower House, it must be sent to the Upper House, and this reduces the possibility of its passage. Ishibashi believes that a move to quash this in accordance with public opinion is another matter, but that a cheap attempt to pass it should be avoided at this time.

A favorable situation for Ishibashi now is the declining popularity of Noboru Baba, who was forcefully pushed into the chief secretary's position by Asukata. At the time, the labor side agreed to have Ishibashi fill the chief secretary post. Asukata did not once say: "I would like to have you serve as chief secretary." It is claimed that it was fortunate for Ishibashi, as he did not have to deal with the aftermath of Asukata by being appointed chief secretary. Whether he becomes one or not, the fact that there was no acknowledgment from Asukata struck Ishibashi very hard. Asukata and Baba are lying low at this time. It is strictly a JSP "moratorium," but this situation cannot harm Ishibashi. His wish to be nominated unanimously as chairman may no longer be a dream in due time. (Incidently, Ishibashi is opposed to election of the chairman by popular vote. He says that votes by party members, whether LDP or JSP, do not necessarily mean that the best person will be elected.)

The question is whether Asukata is willing to forgo the chairman's post readily or not. Going back to his statement of Iwai mentioned at the beginning, the demotion of Asukata during his term of office is a joke. Asukata relies on the Shinsei Kenkyukai (Shinseiken-New Life Study Group). Although it may sound too blunt to say that Asukata did it just for such an eventuality, he has placed two of his assistants in important positions: chief secretary (Noboru Baba) of Shinseiken and chairman (Yuzuru Shimazaki) of Sieshinkai (political deliberating society).

Shinseiken will hold a study meeting at Atami in August. Attention will be focused on Asukata's participation as an "adviser." Factions are found in both the LDP and the JSP, but even the LDP's president does not attend his own factional meeting. Shinseiken is known as the bodyguard of Asukata. Even if he is an "adviser," his attendence naturally will invite complaints from other factions. Conversely, however, it may mean that Asukata and his close associates are being driven into a corner.

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MILITARY

NHK PANEL DISCUSSION ON JAPAN'S SEALANE DEFENSE

OW061045 Tokyo NHK Television Network in Japanese 0000 GMT 5 Sep 82

[NHK political panel discussion entitled "'Sealane Defense' and Japan's Option" with Director General of the Defense Agency Soichiro Ito; chairman of the Nomura Research Institute of Technology and Economics Kiichi Saeki; former Defense Agency Administrative Vice Minister Ko Maruyama; Sophia University Professor Sarashi Kawada; and military commentator Akio Yamakawa speaking, and NHK commentator Kazuo Okamura acting as moderator--pretaped; date and place not indicated]

[Excerpts] [Okamura] At the 3-day working-level Japan-U.S. security talks in Hawaii last week, the two sides agreed to conduct a joint study on ways to defend sealanes. This sealane defense issue is very important in planning Japan's future security and defense. In this context, today we will present a panel discussion entitled "'Sealane Defense' and Japan's Option." Participating in this discussion are the following five guests: Director General of the Defense Agency Soichiro Ito; Kiichi Saeki, chairman of the Nomura Research Institute of Technology and Economics and director of the security department of the Council for Transport Policy: former Defense Agency Administrative Vice Minister Ko Maruyama; Sophia University Professor Sarashi Kawada; and military commentator Akio Yamakawa. Acting as moderator is NHK commentator Kazuo Okamura.

[Ikamura] Director General Ito has just outlined what was discussed at the Hawaii talks. Now, I would like to hear your views on the results of the working-level security talks last week, Mr Saeki.

[Saeki] I would like to give the recent Japan-U.S. talks credit for frank and smooth proceedings, compared with the previous meeting. I feel that the talks were also successful in that the two sides had chances to discuss to some extent their respective scopes of responsibilities in sealane defense. The meeting was equally satisfactory in that the two sides agreed to conduct a joint study on how to perceive the Soviet threat, what scenarios are conceivable concerning sealane defense, how much defense capability is required, and other future issues. The question is how Japan will handle these issues in its own interest. This is what Japan has to tackle in the future. Japan should handle these issues not because the United States forces it to do so. It should handle them on the basis of its own judgment as to their needs and feasibility. Japan should firmly realize the importance of this attitude.

[Okamura] Mr Maruyama, what is your view of the Hawaii talks last week, particularly on the discussion of the sealane issue?

[Maruyama] Concerning this year's talks, they were to proceed in a frank atmosphere as Mr Saeki pointed out. I am very glad that the security talks regained their early frankness in the recent session. I am also glad that the two sides at least reached an agreement to jointly study ways to defend sealanes in the future. Since the two countries are allies, I hope that they will have frank and open-minded talks in the future rather than being mutually cautious.

[Okamura] Mr Kawada, what do you think about the Hawaii talks last week and the joint study of the sealane defense?

[Kawada] I think that I was invited to this discussion because of my constant criticism of the buildup of Japan's defense capabilities as a private citizen of Japan. When I read press reports, I cannot but feel deep misgivings as a private citizen. In the past, the Defense Agency and the government authorities appeared to seek "defensive defense" or the maintenance of basic defense capabilities. Of course, I was aware of some fake aspects in this avowed government line. Nevertheless, I acknowledged their efforts along this line to some degree. However, the recent meeting caused me to have apprehensions as to a possible departure from that line toward exceedingly heavy defense capabilities. I fear that Japan may be dragged into a new U.S. containment strategy against the Soviet Union, a U.S. strategy seeking to step up its local linkage to contain the Soviet Union. I fear that this will be a very serious development as a nation seeking peace.

[Okamura] How about you, Mr Yamakawa?

[Yamakawa] Defense Agency Director General Ito said that the question of sealane defense is to be studied now and, according to press reports, there exists the view that sealane defense is not the Japanese Government's pledge. But I doubt this very much. I think that, while having no strategy of its own to speak of, Japan is allured by such goblins as sealanes and defense and is about to be drawn into the military and global strategies of the United States. This is the beginning of it, I would say.

When he visited Washington in May, last year, Prime Minister Suzuki made a statement concerning sealane defense which can be regarded as a public pledge, and also said that Japan is a member of the West and an ally of the United States. This point remains ambiguous but, at the recent Hawaii meeting, the two sides reportedly agreed in broad terms on the international situation. If this is true, the question brought up this time may undergo meanderings, but I get the feeling that it will eventually develop in the direction sought by the United States.

In the first place, sealane defense is not a question which has been brought up only recently. When Mr Yamanaka was serving as Defense Agency director general, it was brought up informally as feeder route defense. I heard about it. Later Defense Agency officials centering around the Maritime Self-Defense Force [SDF] undertook various projects involving a convoy method and a barrier method. I am not going to elaborate on this. More recently, in late May, even a cabinet meeting on security was held in connection with sealane defense. So, it is not that the government is starting its study of the question now.

The content of the 1981 mid-term work estimate centers around sealane defense including the addition of 50 P-3C antisubmarine patrol planes. The secret consultations underway to discuss a so-called emergency in the Far East give me the impression that Japan is arriving at a very grave turning point. As a matter of fact, I am participating in this panel discussion to find out the truth directly from the Defense Agency director general from the position of the people who are very much worried like Professor Kawada.

[Okamura] Director General Ito and four other guests have just expressed their views on the security meeting. Mr Kawada and Mr Yamakawa rather expressed their fears that Japan may depart from its position of "exclusively defensive defense" and plans to maintain basically required defense strength. Director General Ito, could you briefly mention the background of the recent sudden emphasis on the issue of sealane defense?

[Ito] As has been mentioned by other guests here, it is our desire to thoroughly safeguard our nation, a peaceful nation. If there is a nation which has an aggressive design against our peaceful nation, we naturally should maintain our defense capabilities to foil or check the design beforehand. To this end, we should steadily seek to improve the shape of our national defense from all angles and standpoints. I believe that national defense is a goal toward which we must make endless efforts. We should foil any aggressive designs beforehand in order to protect our peaceful nation. To this end, we have to think about our national defense from all angles. Thus, we wanted to study more closely sealane defense in the recent talks with the United States although the issue had already been contained in our defense buildup plans. Our own, voluntary efforts and the Japan-U.S. security treaty are two pillars of our national defense. Therefore, we wanted to hear fully the views and plans of our partner and to protect Japan, a peaceful nation, based on a common perception of the situation between Japan and the United States. This is how we began closer studies of the issue. It is not a new issue which has suddenly begun to draw our attention.

[Okamura] Mr Maruyama, as you have mentioned, in the past you worked to resume the working-level security talks while serving as chief of the Defense Bureau and administrative vice minister of the Defense Agency. Some people say that sealane defense is not necessary and that it is impossible. What do you think?

[Maruyama] In the beginning of this discussion, you made an explanatory account of sealanes, Mr Okamura. As you said, people have various, different views as to the concept of "sealane." I am not saying which view is correct or which one is wrong. In terms of conception, a considerable number of people think that a sealane is a specific linear belt on the sea like railways. They think that sealane defense means protection of such a belt. This is not true. As a matter of fact, the sea is an unbounded entity. Sealane should rather be interpreted as a method of sea communications. Communications through this method are called sealine communications in the United States. Similarly, there is a concept called airline communications. There are different approaches in sealane defense, based on the extent of the threat posed by a certain country or countries to sealane communications. When sealane communications are 100 percent or partially guaranteed, we should have different defense approaches. As was mentioned in the beginning of this discussion, Japan's dependence on foreign countries in terms of resources and exports is very high. Accordingly, Japan has a very high dependence on traffic with foreign countries. As is well known, Japan has to import even daily necessities such as buckwheat and coffee. Thus, it is a vital issue for Japan to secure means of trafficking with foreign countries. We have to make every possible technical study to secure them. I do not agree with the position of those who give up efforts to this end from the very beginning.

As I have said, some people have different concepts of a sealane and argue that it is impossible to defend sealanes. However, I believe that they will all agree that it is necessary for Japan to somehow protect this system of traffic with foreign countries. The question is how to practically and actually maintain the system. I will express my views on this issue later.

[Okamura] It is true that sealane communications are a vital life-and-death issue. The current arguments over the defense of the 1,000-nautical-mile sealanes primarily concern the question of tasks to be assumed by both the maritime and air self-defense forces. Mr Kawada, is sealane defense really necessary? Is it really an issue worth our study? Some military experts express the opinion that, in view of the presence of Soviet Far East forces and its Pacific fleet, it is impossible to defend sealanes. May I hear your views on these questions and this opinion?

[Kawada] From a broad viewpoint, the sea routes from the Middle East to Japan are very vital to Japan. However, it is not a good idea to defend them only by military means. It is very important to maintain friendly relations with nations located near the sea routes through economic cooperation and various other means. Regarding the opinion expressed by some experts, I would like to say that the opinion concerns what we call the Soviet threat. It may be certainly true that the Soviet Union actually has strong submarine and air forces. However, it is really hard for me to understand what direct bearing the presence of those forces in Vladivostok has on those sealanes. U.S. military sources say that it is unlikely that the Soviet Union would directly invade Hokkaido. This means that the above-mentioned presence of Soviet forces does not actually pose a threat to Japan at this moment. The United States is now eagerly talking about the Soviet threat. I think that this is a phenomenon stemming from a great shift in U.S. world policies under the Reagan administration. We will be making a great mistake if we think that current U.S. policies are unchangeable and invariably authoriative and correct. A report--the Glenn report if I remember correctly--which was presented to the U.S. Congress 3 years ago, recommended that Japan remain a lightly-armed nation. This indicates that the U.S. has not always asked for a Japanese military buildup. The U.S. position on this issue has undergone broad changes. Likewise, U.S. world policy could change in the future. I believe that it will change. The world is now stepping into a multipolar era and, under such circumstances, the containment policy against the Soviet Union is impossible, however hard we might try. Therefore, it would not be wise for Japan to be dragged into such U.S. policies at present. I believe that Japan should conceive its own independent national security.

[Okamura] Before further proceeding with this discussion, I would like to ask Director General Ito two questions. Now, let us study the sealane chart here. In short, at the recent Hawaii meeting, the Japanese side indicated that it would protect the 1,000 nautical mile sealanes--the Southeast sealane and the Southwest sealane--with a supposed width of 200 or 300 km. However, the U.S. side reportedly expressed a different view. It asked Japan to defend a broad fan-shape sea zone between the Southeast and Southwest sealanes. The other question concerns my understanding that the Defense Agency plans to protect about 200 million tons of imports--one-third of less than 600 million tons of the estimated annual import shipments--in the event of an emergency. Is this true?

[Ito] It is a purely military question whether the defense should be limited only to the sealane belts or the entire fanshape sea zone should be protected. We would like to have competent experts discuss this question in the future. I suppose that there would be varied options over this issue. I cannot answer the question in a generalized manner at present. I would like to entrust the question to the experts concerned. As I have already mentioned, as a nation which is surrounded by sea, it is natural for Japan to defend its waters. To this end, it is true that we are making some numerical calculations as you have just said. These calculations were begun several years ago by a branch under the chief of staff of the Maritime Self-Defense Force. Based on the then economic data, the branch figured that Japan imports, on an average, 600 million tons annually and that she should have naval defense capabilities strong enough to ensure import of at least 1/3 of that amount in times of emergency. It is true that the Defense Agency is making those calculations, but they still represent an estimate and have not yet developed into a definite and entire program for the Defense Agency. They will be included in future studies and discussions.

[Okamura] Direct General Ito, as has been pointed out by Mr Yamakawa, in a fundamental sense does Japan's sealane defense not represent a shift of responsibility from the United States in compliance with U.S. world and Far East strategies? It is really disturbing to think that we have to prepare against forces in Vladivostok. How should the Japanese Government respond to a possible U.S. demand that, in the event of an emergency, Japan block its three straits? What do you think?

[Ito] I am frequently asked the same question. As director general of the Defense Agency or as the man in charge of national defense, I am in the position to have the most frequent contacts with U.S. officials dealing with defense matters. It is certain that we receive various requests from the U.S.

side. However, I always tell them that Japan has many restrictive conditions to consider, including public opinion and the stern historical fact that we are the only country which actually suffered from the atomic bomb. Needless to say, the United States understands Japan's position. In this sense, it is not totally true that Japan is being dragged into U.S. strategies as has often been alleged in various publications. We have our say whenever it is necessary. As has been praised by Mr Saeki and others, the Japanese delegation laboriously explained the position of Japan to the U.S. side at the Hawaii meeting, where the U.S. side made very stern requests of Japan. I hope that there will be no misunderstanding in this regard. In this context, it is solely to defend Japan that we discussed the issues of the three straits and sealanes.

It is an exercise of our right to self-defense that we discuss and formulate better operational programs and ask the United States for support where we have in sufficient capabilities. We have repeatedly stated this. At this discussion, someone referred to what happened to the seamen's union in the past. We would like to defend our sealanes in the event of emergency, without forcing the past painful sacrifices on the seamen's union. We will make efofrts not to repeat such past sufferings. Our purpose is to have a kind of deterrent power which can foil, in advance, the intention of a country to strike at our sealanes, should there be such a country. Accordingly, the question of blockading the three straits and that of Vladivostok may be considered only if such a blockade is necessary for Japan's self-defense. We will not discuss the question simply because the United States presses for it. Especially, the question of blockading the three straits is, saliently, a big international question; I believe this question is a serious political one, which must be handled with extreme prudence.

[Okamura] Mr Maruyama, I want to change the subject. During last year's Japan-U.S. consultations in Hawaii, the United States reportedly made a request, which considerably exceeded the defense level envisaged in the 1983-1987 defense buildup plan and the defense program outline. In your opinion, can sealanes out to 1,000 nautical miles be defended with the level of defense envisaged by the 1983-1987 defense buildup plan and the defense program outline?

[Maruyama] Since the defense program outline is mainly based on a peacetime situation, if we look ahead, say 10 years ahead, or beyond 1987, the last year of the 1983-1987 defense buildup plan, I think, in my personal opinion, that the level of defense envisaged by the outline and the buildup plan are insufficient. We have to come up with an appropriate plan.

Our air defense capability over sea is totally insufficient. As is often pointed out, more backfires have been deployed, and the recent Falklands dispute between Britain and Argentina underscored the great threat posed to ships by aircraft. This requires us to recalculate the figures.

[Okamura] Director General Ito, Mr Maruyama has just pointed out that the 1983-87 defense buildup plan and the present defense program outline are insufficient for the defense of sealanes, particularly seen from an air defense point of view. What is your own opinion? Furthermore, there is the "1 percent of GNP" ceiling on defense outlays which was adopted at a cabinet meeting in 1976. What do you think of this ceiling?

[Ito] Before answering your question, I would like to clarify one thing: earlier, I mentioned Valdivostock, accidently repeating the name after Mr Yamakawa had mentioned it. As far as the Defense Agency is concerned, it has not the slightest intention of blockading Vladivostok. I want to stress that our concept of purely defense capabilities does not stretch that far.

What we are aiming at is a basic defense capability, and this, I believe, is being gradually understood by the public, thanks to explanations by Mr Maruyama and by other means. We want to achieve the level of defense which is absolutely necessary for Japan in peacetime as soon as possible. We seek to attain that level at the end of the 1983-87 defense buildup plan, under the defense program outline. It will be verydifficult to completely attain this goal for fiscal and various other reasons. So we are trying to attain most of it. The nature of defense is such that it is impossible to be 100 percent complete in every aspect. What we need is steady, unceasing efforts. The 1983-1987 defense buildup plan is one of the goals for these efforts.

As for the 1 percent ceiling, the cabinet decision on this ceiling is very important, as repeatedly pointed out by the prime minister and myself. So we have to abide by it. On the other hand, it is our duty, as defense officials, to achieve a defense capability which is reliable in the eyes of the public. The 1983-1987 defense buildup plan is the fruit of our efforts to integrate these two requirements. It is our judgment that there is no need to change during the plan period the cabinet decision on holding defense outlays below 1 percent of the GNP. When it comes to a question of how much the plan can contribute to sealane defense, we cannot say that it will ensure 100 percent sealane defense, just as there is no way of achieving perfection in defense, but we believe that we will be able to defend our sealanes in considerable strength.

[Okamura] Mr Maruyama, we understand that earlier 6 million tons of cargo is carried into Japan, mostly by foreign ships or chartered foreign ships. If the Japanese self-defense forces use arms to cope with attacks on these foreign ships, or the Japanese SDF react to an attack on the 7th Fleet, does this represent an exercise of the right of collective defense?

[Maruyama] I understand the academic arguments presented by scholars. Some of them argue that a warship represents an extention of territory, and if Japan defends a warship of another country, it will mark the first step toward exercising the right of collective self-defense. Even some government officials hold this view. When a country is attacked by a third country and if its ally comes to its aid, this represents an exercise of the right of collective self-defense as defined by the UN Charter. In the case of Japan, if it is attacked by a foreign country, the United States is duty bound to defend Japan. On the other hand, if the United States is attacked by a third country, Japan is under no obligation to defend the United States. The Japan-U.S. security treaty is based on this principle. Therefore, if Japan joins in an action connected with defending the United States, it may be said that Japan opted to exercise the right to collective self-defense.

However, an attack which takes place within 1,000 miles of Japan, constitutes aggression against Japan. So defending Japanese territory represents an exercise of Japan's inherent right to individual self-defense. Since the United States cooperates in this defense, I believe that the allegation about a violation of the constitution is groundless if the matter is considered broadly and reasonably.

[Okamura] Defense Agency Director General Ito, what do you think of Mr Maruyama's interpretation? Article 5 of the Japan-U.S. security treaty deals with an armed attack on territories under the administration of Japan. What is your interpretation of the Japanese SDF's reaction to an attack on the 7th Fleet, when viewed from the standpoint of the right to collective self-defense?

[Ito] We take the stance that an action taken for Japan's self-defense, when Japan is attacked does not violate the constitution or fall within an exercise of the right to collective self-defense.

[Okamura] Director General Ito, when do you think the current joint study on sealane defense will reach a conclusion and how the conclusion will be reflect in Japan's defense policy?

[Ito] Our working-level officials have just returned, and preparations will soon be undertaken. So I cannot say now when the conclusion will be reached. As for the question of what will happen as a result of the study, some aspects may be taken into our defense policy and others may not. The question will be considered when the time comes. The purpose of the study is not to reflect its results in our defense policy. We plan to approach the study with the stance I mentioned earlier.

[Okamura] Thank you very much.

CSO: 4105/205

MITI TO STUDY LONG-TERM SPACE DEVELOPMENT PROGRAM

Tokyo JPE AVIATION REPORT-WEEKLY in English No 585, 25 Aug 82 pp 8-9

[Text] The Ministry of International Trade and Industry (MITI) will set up a task force in its Machinery and Information Industries Bureau possibly in early October to study a long-term vision for Japan's outer space industry, especially software technology for outer space utilization.

The task force, tentatively named the Space Industry Vision Committee, is expected to map out the vision by March 1983. Under the vision, MITI will proceed with development of software technology as well as rockets, satellites and other hardware in order to solidify the Japanese outer space industry.

Japan has launched more than 20 satellites since 1970, while the space industry's annual sales have reached ¥100,000 million, according to a report worked out by an advisory body to the bureau's director-general in April 1981. But the Japanese industry's technological foundation is said to be less competent than in Europe and the United States. Furthermore, its market is smaller and more barriers exist against its introduction of foreign technology.

Although Japan's advanced electronics technology has sharply improved its satellite know-how, it is far behind other industrialized nations in developing software or ways to utilize outer space.

The task force, consisting of space development experts, will study new ways to use outer space, projected 10 to 20 years ahead, and also how to produce industrial needs based on that projection. These factors will be incorporated into the long-term vision.

Specific ways to use outer space would include Japan's cooperation with foreign nations in launching maritime observation satellites. Such cooperation could lead to international development of maritime resources. Japan now plans to launch such satellites on its own.

Other ways would include how to effectively use data collected by meteorological satellites.

NASDA TO LAUNCH TEST SATELLITE AUG. 26

The National Space Development Agency (NASDA) will launch an engineering test satellite, named the ETS-III, from its Tanegashima Space Center on Aug. 26 for the purpose of establishing basic technology for future large satellites.

Among the satellites which Japan launches on its own, the ETS-III is the first one to adopt the three axial attitude control system.

The launching booster will be the ninth and last N-1 rocket. NASDA started using the N-1 rocket five years ago.

CSO: 4120/421

SCIENCE AND TECHNOLOGY

RADIOWAVE ABSORBING CONSTRUCTION MATERIALS STUDIED

Tokyo SERAMIKKUSU in Japanese Jul 82 pp 530-536

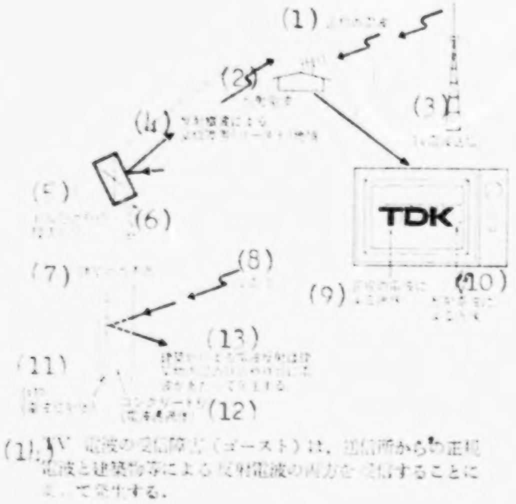
[Article by Ken Ishino, TDK Electronics Co, Ltd]

[Text] I. Introduction

As a result of the concentration of the population in urban centers accompanying the high degree of economic growth, there has been a trend toward high-rise construction in order to utilize land area more effectively, and this trend has caused the emergence of TV ghost interference as a matter of utmost concern to city dwellers.

As shown in Figure 1, TV reception interference due to construction can be classified into two groups: a reflection phenomenon resulting from the reflection of radio waves from the walls of buildings in the so-called "ghost interference" behavior, and a phenomenon in which radio waves are obstructed to cause "building shadow interference." It is said that the average number of households which experience building shadow interference is 20-30 per building, while the number of households experiencing ghost interference is estimated to be several hundred.(3) At the same time, building shadow interference is considered to be created by reflected radio waves dormant in the wall rather than the obstruction and weakening of radio waves. This is why the structure itself is the main problem which has to be considered in any countermeasures for TV reception interference.

[see Figure 1 next page]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TDK
(14) TV 電波の受信障害（ゴースト）は，送信所からの正規電波と建築物等による反射電波の両方を受信することによって発生する。

Figure 1. Mechanism of ghost generation.

Key:
1. Normal radio wave
2. Reflected radio wave
3. RV transmission station
4. Region of reception interference (ghost) due to reflected waves
5. Reception area in shadow of building
6. Construction
7. Surface of construction
8. TV wave
9. Normal picture image
10. Image with reflected wave
11. Steel reinforcing (radio wave reflector)
12. Concrete wall (radio wave transmitter)
13. Radio wave reflection from a structure is created when radio waves are incident on reinforcing steel or iron aggregate within the structure.
14. Interference reception of radio waves (ghost) is generated when normal waves broadcast by the station and reflected waves from structures and other sources are received.

TV electromagnetic waves possess diffraction and reflection properties just as light. As a result, when TV waves traversing free space strike against a medium unlike free space such as a metal plate, reflective phenomena are created just as with light. The magnitude of this reflection is determined by the degree to which the electromagnetic properties of this medium differ from those of free space.

Some electromagnetic wave reflection properties of representative building materials are listed in Table 1.

Table 1. TV wave reflection rate of building material.

(f = 100 MHz)

(1) 金 属 板	100%
(2) コンクリート（鉄筋入り）	90
(3) コンクリート（無　筋）	10
(4) ガ ラ ス	0.3
F R P	6
(5) 磁器タイル	2
(6) モ ル タ ル	16
(7) フェライト電波吸収体	0.5

Key:
1. Metal plate
2. Concrete (with steel reinforcement)
3. Concrete (with no reinforcement)
4. Glass
5. Ceramic tile
6. Mortar
7. Ferrite magnetic absorber

Radio wave absorbers usually are effective countermeasures for attenuating reflected radio waves. For example, antenna experiments conducted within a room and measurements of incident interference removal property demonstrated that the placement of radio wave absorbers on the walls of a room prevented reflection from the walls and was very effective in creating a chamber opaque to radio waves close to that of an apparently limitless space. On the other hand, no material has been developed which has good weather resistance and of sufficient thinness for outdoor use, and the development of new material which selectively absorbs radio waves is awaited. The countermeasures to date have been limited to CATV type localized efforts.

Professor Suetake and colleagues at the Tokyo Institute of Technology focused on magnetic properties in the high frequency region of the oxide ceramic "ferrite," which is one of the ceramic materials, and conducted a series of studies on their use as magnetic radio wave absorbers, as a result of which they demonstrated that ferrite can be placed in thin layers on the walls of a small radio wave opaque room and display excellent radio wave absorbing property (6-8). Based on these results together with the weather resistance and thin layer forming property of ferrite, they directed their attention to the reassessment of ferrite as a building use radio wave absorber, and practical experiments were conducted on various aspects mainly at NHK buildings (9-11).

As a result of these researches, the first effort in the world to put into practice on a practical scale countermeasures to prevent ghost interference was made on a sewage treatment plant (five stories aboveground, height 25 meters) constructed in the Inada District of East Osaka by the Osaka Urban Prefecture 2 years ago. As shown in Figure 2, the ghost interference area involved roughly 300 households between 250 meters and 500 meters (about 250 meters east of the Senya River) east of the building. NHK took cost performance into account and computed the predicted interference improvement effect with the aid of a large computer, as a result of which it decided that rather than install this material on the entire wall, only about 40,000 pieces of tile covering about 650 square meters of the east wall at the fourth and fifth floors and projecting towers would suffice.

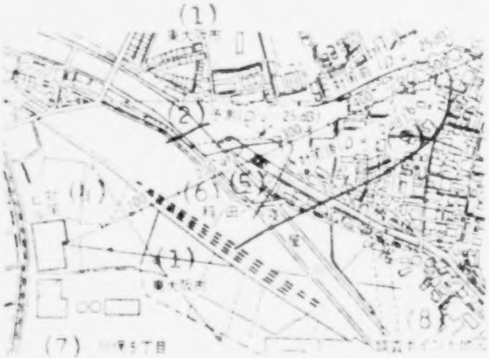

Figure 2. Ghost interfernece area before and after installation of radio wave absorber.

Key:
1. East Osaka City
2. Predicted (D/u = 25 dB)
3. Before installation (Du = 25 dB)
4. Building countermeasure
5. No 2 Senya River
6. Inada
7. Kawayasu 5 Chome
8. Map of observation points
9. After countermeasure (Du = 2 dB)

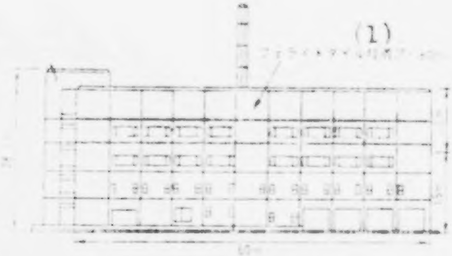

Figure 3. Sections where ferrite tile was installed.

Key: 1. Ferrite tile installed area about 600 square meters

The method of installation was to place the tile directly on the concrete wall with a strong adhesive and then to coat this surface with an epoxy paint finishing coat. The improvement effect was as predicted (see figure 2); the interference range was reduced from 500 meters to 300 meters, the TV reception of 300 households was essentially resolved, and the ghost countermeasure was successfully executed.

Whereas ghosts were so strong before the tile installation that "watching TV became too difficult," the ghost problem could essentially be ignored once the tile was installed. As a result, a maintenance fee became unnecessary, compared to CATV which resorts to the use of cables, and there was no need to confer with different individuals; attention was renewed on the use of ferrite as a radio wave absorber for building use.

This paper will introduce the subject of radio wave absorbers for building use for resolving the radio wave interference problem considering mainly ferrite.

II. What is a Radio Wave Absorber?

Radio wave absrober refers to a material which absorbs radio waves and attenuates the waves almost completely or essentially does not reflect these waves, and a material which causes loss in electromagnetic energy (radio waves) no matter which mechanism takes place.

Carbon is known to be a material which causes resistance loss and has long been used in this role; carbon powder supported by some suitable material (such as polyurethane foam) has found practical use as an electromagnetic wave absorber. This type of electromagnetic wave absorber is light in weight and also displays electromagnetic wave absorbing property over a wide range in wavelengths. On the other hand, a thickness of about 1.5 meters is necessary in the high frequency of VHF TV and its weather resistant property is rather poor, so that its application has been limited to indoor use.

A new electromagnetic wave absorber was developed as a material which causes loss in elecgromagnetic energy in the form of ferrite. Its thickness for use in the VHF band ranges between 4 mm and 10 mm, and a thickness of roughly 1/200 that of the carbon absorber will suffice in the design.

At the same time, the physical properties of ferrite, shown in Table 2, are similar to those of tile for external use. Some of the reasons ferrite tile drew attention as ghost countermeasure material in the construction trade are the thinness and superior weatherbility of the same order as regular tile.

(see Table 2 next page)

Table 2. Various properties of ferrite.

(1)項目	(2)特性値
(3)直流抵抗率	10^6 Ω·cm 以上 (11)
(4)密度	4.8 g/cm³
(5)抗折強度	5.5×10^2 kg/cm²
(6)圧縮強度	2.4×10^3 kg/cm²
(7)熱膨張係数	10×10^{-6}/℃
(8)熱伝導度	1.5×10^{-2} cal/s·cm·deg
(9)比熱	0.2 cal/g·deg
(10)吸水率	0.2%

Key:
1. Item
2. Characteristic value
3. DC resistivity
4. Density
5. Transverse rupture strength
6. Compressive strength
7. Thermal expansion coefficient
8. Thermal conductivity
9. Specific heat
10. Moisture absorption rate
11. More than 10^6 Ω·cm

III. Design Methods for Ferrite Radio Wave Absorbers (11)

The basic structure of a ferrite radio wave absorber is illustrated in Figure 4. A number of 100 x 100 mm ferrite tiles are pasted close together on a metal plate. The reason for this construction is that this design enables a total synthetic reflection close to 0 in the multiple reflection model. This is an extremely simple type; the meahanism for attenuating radio waves is illustrated in model manner in Figure 5 (a) and (b).

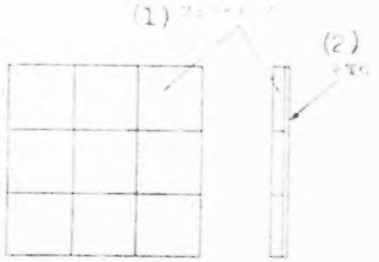

Figure 4. Construction of ferrite radio wave absorbing wall.

Key:
1. Ferrite tile
2. Metal plate

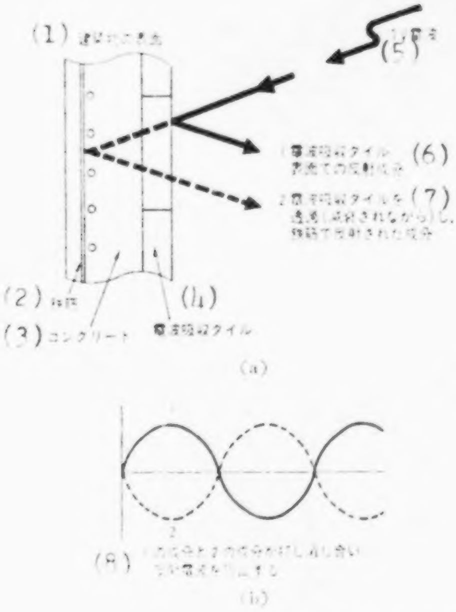

Figure 5. Operation model of a ferrite radio wave absorber.

Key:
1. Surface of construction
2. Steel reinforcement
3. Concrete
4. Radio wave absorbing tile
5. TV waves
6. Reflected component from TV wave absorbing tile
7. Component transmitted (with attenuation) through radio wave absorbing tile and refelcted by steel reinforcement
8. Components (1) and (2) cancel each other and prevent reflected radio waves

This is to say, the incoming radio waves (TV waves) incident on the wall surface made up of ferrite tiles are separated into a primary reflection wave component which is reflected from the ferrite tile surface and a component that is a transmitted radio wave which penetrates to the interior of the ferrite tile. The transmitted wave is reflected by a reflecting body at the back face of the ferrite and is attenuated through ferrite loss as it becomes a secondary reflected wave and is radiated from the ferrite surface. As seen in Figure 5 (b), the amplitudes of these pirmary and secondary reflected waves are the same, and when their phase difference is 180°C, the two waves annihilate each other and result in 0 reflection. This condition is determined by the multiple magnetic susceptibility ($\mu_r = \mu_r' - ju_r''$), the magnetic loss (tan $\delta_\mu = \mu_r''/ r'$), and the thickness of the ferrite tile.

The thickness of the VHF absorbing ferrite tile that was developed is 7.5 mm, and the radio wave absorbing properties of the type shown in Figure 6 are incorporated. Its reflection attenuation in the VHF TV frequencies is more than 20 dB. That is to say, it has a reflection rate less than 1 percent and has superior property in preventing ghosts.

The operating principles described above serve as the basis for the development of various radio wave absorbing material for construction use also taking into consideration preparation methods.

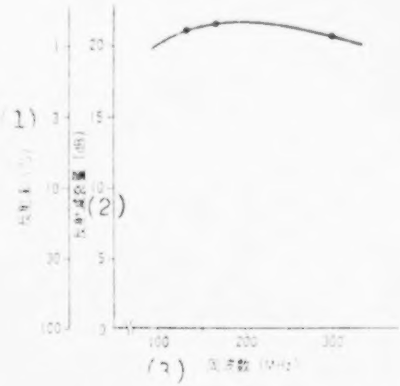

Figure 6. Frequency characteristics of radio wave absorbing wall.

Key:
1. Reflection rate (%)
2. Attenuated reflection (dB)
3. Frequency (MHz)

IV. Radio Wave Absorbing Material for Building Use

Radio wave reflection from high-rise buildings is claimed to be the principle cause of TV ghost interference. Even when a ferrite radio wave absorber is used as the coating material over the outer walls of a building, the use of ferrite building material as is without modifications, as illustrated in Figure 4, makes it difficult to attain the desired effect. Since the ferrite is mounted only with the use of an adhesive, its installation on the outer wall outside of a building where termperature changes are severe can result in the hazard of the ferrite plate peeling away and falling off the wall. In addition, there is a major problem in installing it on a concrete wall. There must be practical construction taking into account finishing methods for this building material.

1. Drainboard Type Radio Wave Absorbing Wall (Continuous Magnetic Field Type Ferrite Radio Wave Absorbing Wall)

Ferrite is a magnetic material, and it has the property common to magnetic materials that when the direction of the magnetic field becomes discontinuous, it suffers great deterioration in magnetic properties. As a result, it becomes necessary to paste the tiles close together so that the magnetic field does not become discontinuous and thereby prevent this deterioration in magnetic property. In another direction, TV waves are propagated in a horizontally polarized manner. That is to say, the electric field component is propagated perpendicular to the earth's surface.

Directing attention to this polarized wave characteristic, the "drainboard type radio wave absorption wall" construction in which ferrite tiles are pasted close together in the direction of the magnetic field, as illustrated in Figure 7 (a), becomes possible. Open spaces at the rate of about 35 percent in the direction of the electric field have been found permissible by adjusting the thickness of the ferrite tile, by which means reflection attenuation of the order of 20 dB or more can be assured. In this type of construction it is also possible, in addition to fixing the tile simply with adhesive, to use a metal channel to hold the tile mechanically, as illustrated in Figure 7 (b). An example of a curtain wall construction based on this design which was test produced as a radio wave absorbing wall is illustrated in Figure 8.

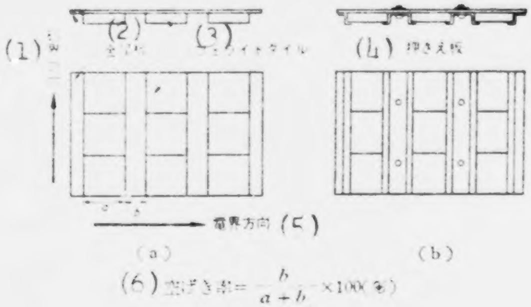

Figure 7. Construction of continuous magnetic field type (drainboard type) radio wave absorption wall.

Key:
1. Direction of magnetic field
2. Metal plate
3. Ferrite tile
4. Cap plate
5. Direction of electric field
6. Space ratio = b/(a + b) x 100 (%)

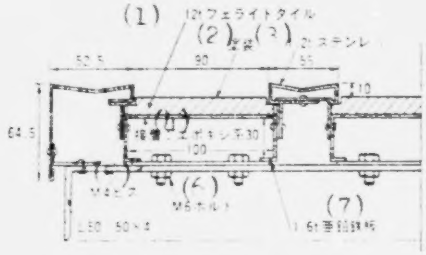

Figure 8. Curtain wall radio wave absorbing wall.

Key to Figure 8:
1. 12 t ferrite tile
2. Paint
3. 1.2 t stainless
4. Adhesive: epoxy family 30
5. M4 screw
6. M6 bolt
7. 1.6 t galvanized iron

2. Concrete Composite Radio Wave Absorbing Wall

The electric properties of concrete vary with the moisture content, but they generally are in the range of 5-7 dielectric constant. At a thickness of about 20 mm, which is the thickness commonly used, there is only about 10 percent reflection of VHF waves. On the other hand, where reinforced concrete is involved, the steel reinforcement becomes a reflector, and the concrete begins to assume the role of a perfect reflector just as a metal plate. A lattice type steel reinforcement forms a reflecting body when the spacing (pitch) is very small compared to the wavelength. A pitch of about 200 mm represents the limit at which this type construction can serve as a reflector of VHF (this depends on the effective spacing of the steel reinforcement in case of a double reinforcement with mutual offset).

In order to place ferrite tile on reinforced concrete to serve as a radio wave absorbing body, the steel reinforcement should be treated as a completely reflecting body, and a dielectric material with dielectric constant of 5-7 (concrete in this case) should be sandwiched between the ferrite tile and the reflecting body in a composite construction that needs to be adopted in the design. Even in this type of construction, the control of the thickness of the ferrite tile makes possible the design of a superior radio wave absorbing wall. For example, assuming a concrete wall thickness of the ferrite tile should be 10 mm. One example of this construction is the precast concrete type radio wave absorbing wall suitable for curtain wall construction for use in high-rise construction as shown in Figure 9.

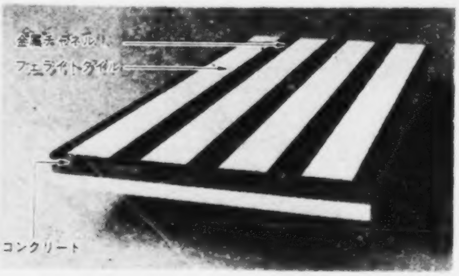

Figure 9. Precast concrete type radio wave absorbing wall.

Key:
1. Metal channel
2. Ferrite tile

3. Three-Layer Radio Wave Absorbing Wall

A design which takes into consideration weatherability, wind pressure resistance, and external appearance of a direct outer wall for medium high-rise construction is that of a three-layer type radio wave absorption wall in which the ferrite tile is sandwiched between asbestos-calcium silicate boards. An example is shown in Figure 10. Asbestos-calcium silicate boards are used to hold the ferrite tile between them, and a reflector also serving as reinforcement in the form of 0.8 mm thick aluminum plate is pasted on the back side. Another asbestos-calcium silicate plate (6 mm) of very high reliability is placed on the surface of this panel to further improve the weatherability and strength. This construction results in about 5 dB less performance compared to ferrite tile by itself, but adequate radio wave absorption property (about 15 dB) has been obtained (12).

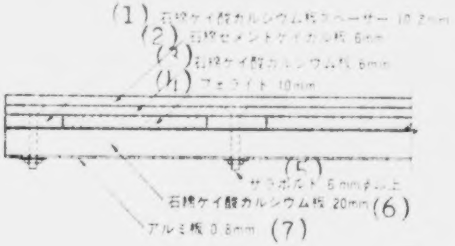
(1) 石綿ケイ酸カルシウム板スペーサー 10.2mm
(2) 石綿セメントケイカル板 6mm
(3) 石綿ケイ酸カルシウム板 6mm
(4) フェライト 10mm
(5)
サラボルト 6mmφ以上
石綿ケイ酸カルシウム板 20mm (6)
アルミ板 0.8mm (7)

Figure 10. Three-layer radio wave absorption wall.

Key:
1. Asbestos-calcium silicate plate spacer 10.2 mm
2. Asbestos-cement-calcium silicate plate 6 mm
3. Asbestos-calcium silicate plate 6 mm
4. Ferrite 10 mm
5. Countersunk bolt 6 mm or more
6. Asbestos-calcium silicate plate 20 mm
7. Aluminum plate 0.8 mm

V. Concluding Statements

The impact on today's information-oriented society by TV through its news, education, and entertainment areas is immeasurable; the new construction material introduced here which incorporates radio wave absorption property is not simply a construction material of the type used in the past but can be used to improve this information medium. The oxide magnetic material "ferrite" which is widely used in information equipment as a loss and high dielectric constant material in the high frequency region is now being reassessed as construction material and is also an illegitimate offspring in this information oriented society.

Construction material with radio wave absorbing property can be represented by concrete, which has been in wide use for a long time. Some examples are: spherically shaped granular inorganic material into which carbon black or iron carbonyl powder mixed is pasted over followed by a cement mortar family compound type sticky adhesive to form black or board type radio wave absorber for construction use (13); ferrite particles with the mean particle size greater than 60μm mixed in as one component of the concrete aggregate which has been reported (14); and the recent report of the use of carbon fiber or carbon beads to form concrete type radio wave absorbing material with compressive strength greater than 250 kgf/cm^2 (15).

This paper was directed at TV ghost interference prevention countermeasures centered mainly on radio wave absorbing material; however, this problem is not limited to TV ghosts, but also applies to shipping radar pseudo images which plague the Honshu-Shikoku ferry; the reflection problem from structures is a major social problem covering a wide range of TV frequencies. The construction materials problem similar to the dynamics and structural science requirements of the past requires new designs which incorporate characteristics such as those relating to radio waves which together with the development of new materials point the way to the subjects to be taken up in the future.

Bibliography

(1) Ito TV Zasshi, 29, 4 (1975).
(2) Endo, Proc 58th Symposium (Ministry of Postal Services Japanese ITV Conference (July 1975).
(3) Akita, Kenchiku to Gijutsu, Shiko, (5) (1981).
(4) Japan Broadcasting Association, "Handbook for Radio Wave Interference Countermeasures with Radio Wave Absorber," (1981-1982).
(5) Suetake, et al., Shingakukai, Microwave Research Data (January 1967).
(6) Naito, et al., Shingakuron (B), 52-B, (11) 26 (1967).
(7) Naito, et al., Shingakuron (B), 52-B, (7) 398 (1969).
(8) Ishino, et al., 1974 Shingaku Zendai, 933.
(9) Yamashita, et al., Shingakuron (B), 561-B, (8) (1978).
(10) Akita, et al., Television Gakujutsuho, RE 77, (5) (1977).
(11) Ishino, et al., Oyo Butsuri, 43 (11) 71 (1974).
(12) Nippon Asbestos (Co) Technical Data, "Radio Wave Absorbing Panel."
(13) Patent Disclosure 1970-25625.
(14) Patent Disclosure 1977-27355.
(15) Shimizu, et al., Shingaku Giho, EMCJ 81-71 (Dec 1981)

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ECONOMIC

TRADING COMPANIES' ROLE IN ADVANCED TECHNOLOGY DISCUSSED

Tokyo SENTAKU in Japanese Sep 82 pp 76-78

[Article: "General Trading Companies Cannot Catch Up With Advanced Technology"]

[Text] "The trade handled by the trading companies today includes iron and steel, chemicals and energy," (a large general trading company former employee).

It has been several years since the decline of trading companies was first noticed. The pace of the depression which is overtaking the general trading companies is steadily quickening.

The 1981 settlement of accounts indicated that seven out of nine big trading companies, except for Mitsubishi and Sumitomo, were almost in the red. The profits made over the period were completely eaten up by irrecoverable redemption funds, including bad debt and bad investment. They are barely tiding over the settlement of accounts by selling stock in the property.

For several years, the general trading companies have been searching for future items. One of the biggest targets is the advanced technology industry.

But how much room is left in the advanced technology field for the general trading companies to occupy?

Booming "Technology Offices"

Since last year, self-important new organizations with names such as new field development team and technology office have been born one after another in every trading company.

For example, C. Itoh & Co's new field development team in its business department was started in October last year, Sumitomo Shoji's bioengineering project team in February this year, Mitsubishi Shoji's technology office and Marubeni's new technology office in April, and Kanematsu-Gosho's chemical product headquarters and chemical product enterprise development office in May.

These moves were all aimed at trade in the field of biotechnology, which is one of the advanced technologies today. As far as organization aimed at advanced technology is concerned, Mitsui Bussan established a technology department in August 1970, and Nissho-Iwai a technology office in February 1974. These two companeis are the "old shop" among the general trading companies.

However, it is a different story as far as today's hottest technology is concerned, even for Mitsui Bussan and Nissho-Iwai, which are considered to be in the vanguard. It is highly questionable how much these two "old shop" enterprises have achieved in the fields of semiconductors, electronics, CAD (computer-aided design), CAE (computer-aided engineering) which is more advanced than CAD due to its use of computer technology over the entire range of the production development process, biotechnology, gene manipulation, computer graphics, artificial intelligence, solid electrolyte, and CADD.

For those trading companies which do not engage in their own technology development, "advanced technology" means to catch other companies' advanced technology information as soon as possible and then act as intermediaries between the makers and the consumers, and to catch the information needed to expand the volume of products produced by the new technology which is handled by its own company.

This is not going very well, no matter which trading company one looks at.

Mitsubishi Shoji and Bussan are two general trading companies which are representative of Japan. For the past several years, these two companies have been suffering hardships. Mitsubishi Bussan went into the red finally in the 1981 settlement of accounts due mainly to the IJPC problem, while Mitsubishi Shoji relies on liquefied natural gas (LNG) for the greater part of its profits.

Although Mitsubishi Bussan led other companies in establishing a "technology department" 12 years ago, its original motive was to gather from abroad the newest information concerning the petrochemical industry. To be sure, the technology department of Mitsubishi Bussan has done brilliantly in this area. The advanced petrochemical technology introduced by its technology department was later brought to fruition by makers including Mitsui Petrochemical, and technical personnel from various departments, including the mechanical, food, and paper pulp departments, were poured into the technology department.

Today this is nothing more than the advanced technology information of an era ago. How much achievement is made by the technology department in fields which are considered to have potential in the future?

Mitsubishi Bussan was the envy not only of the other trading companies but also of the medical supplies makers as well as food-related industries when its technology department succeeded last year in linking up with the U.S. Genentech, which was sought after as the favorite among biotechnology pioneers. Because biotechnology is the technology which can make industrial-scale mass production of methanol (industrial alcohol) as an energy source, pomato (a hybrid between potato and tomato) as an effective weapon to combat the food shortage, and medical supplies such as interferon a reality.

President Swanson of Genentech was invited by the technology department to visit Japan, and the company's technological appeal was displayed for him. Mitsubishi Bussan had also contacted other comapnies similar to Genentech and boasted: "We are intermediary to nearly half the industry through cooperation between them and Japanese enterprises." However, it does not have much to show as far as CAD, CAM, and electronics are concerned.

Mitsubishi Shoji, too, is not very sensitive to the advanced technology. Dainippon Machinery Industry, which has headquarters in Yamanashi Prefecture, is Japan's only special maker of robots, and the European market has been exploited over the past several years. That was the last resort, because domestic medium and small enterprises were not buying any robots. Mitsubishi Shoji is said to have acted as the intermediary when this European advanced was made. A more accurate description of the truth is that Mitsubishi Shoji merely followed Dainippon Machinery Industry. Mitsubishi Metal's "silicon single crystal," which is a raw material used in semiconductor manufacturing, is handled only slightly by a small number of personnel in this company. The handling of products in the electronics field is the area most lagging among all the areas handled by the company.

Subsidiaries Hustle Better Than the Parent

Compared with Mitsubishi Shoji and Bussan, other companies led by C. Itoh & Co have challenged the advanced technology field more aggressively.

CAD, in particular, has been pursued by Marubeni and Sumitomo since the mid-1970's. CAD is a technology which increases the efficiency of design process through the use of graphics process technology. This technology was developed mainly by the U.S. auto makers and aircraft industry, including GM. In Japan, CAD was introduced by Toyota and Nissan in earnest only recently, and an independent market is being developed.

Marubeni had its eyes on CAD from early on. Marubeni approached Mr Haranty [phonetic], who engaged in the development of CAD at GM and later left GM to organize the independent MCS Co, even before he became an independent. Nevertheless, it failed to see that CAD was a "golden egg" which would grow into a domestic market of 40 billion yen a year today (120 billion yen by 1985). The person who was in charge at that time was mortified: " If only we had gone into it further at that time."

There was a similar case concerning the domestic agent rights to handle CAD. The venture business famous in the field of CAE is the SDRC Company of the United States. A certain trade company which noted the existence of SDRC Company and kept contact with it decided several years ago that the time was not ripe and gave up altogether the introduction of the technology to Japan. However, the SDRC Company, in cooperation with GE, landed in Japan this year. This is an example of discovering a golden egg yet losing the timing to hatch it.

Be that as it may, others are more persistent in their efforts than either Mitsubishi Shoji or Mitsubishi Bussan. In the field of advanced technology, especially computers and electronics, C. Itoh & Co, Marubeni, Sumitomo Shoji, and Kanematsu-Gosho have adopted a 100 percent subsidiary strategy and thus achieved considerable results. Typical examples include the importation of semiconductor manufacturing equipment from the United States over the period from the mid-1960's to the early 1970's.

Without this semiconductor manufacturing equipment Japan could not have achieved the prosperity of its semiconductor industry today. Importing this technology and introducing it to Japan was truly an important achievement. In addition, there are also some other individual cases. For example, C. Itoh & Co's data system software "Karma" for CAD, Marubeni Hitec's "Applicon," and Nissho Electronic's software "SAS" for computer graphics are holding up well.

Though struggling with a settlement of accounts in the red, Kanematsu-Gosho has established seven or eight subsidiary companies dealing with advanced technology. Of these subsidiary companies, Kanematsu Electronics has grown so much as to be listed next year.

Kanematsu Electronics may be an exception. The truth of the matter is that these subsidiary companies must compete with some 200 medium and small companies specializing in computer and electronics.

One of the important technologies related to CAE is solid modeling. This is a technology for creating a picture image which looks exactly like the real thing using a computer. It is a system indispensable for the development of complicated machines. The Shape Data Co of Great Britain is especially highly valued in the field of solid modeling. A special trading company of the Sumitomo group and Rikei, a trading company specializing in electronics, competed for Shape Data agent rights in Japan, and Rikei was the winner.

In the field of computers, artificial intelligence has not yet been claimed by any trading company. In this field, the user is leading the trading company. Computer makers and large enterprises are dispatching personnel to the United States to acquire the technology. The trading companies may have no role to play unless something is done. Even in the field of biotechnology, not to mention the example of Mitsui Bussan, the trading companies are doing no more than matching Japanese enterprises with European and American venture businesses for research contracts--very nearsighted behavior.

Like Buying a "Lottery Ticket"

Why are such matters not going well? A number of reasons come to mind. First of all, there is the nature of the trading company. The trading companies during their high rate of growth period continued to expand mainly through commissioned trading with the major industrial makers. Therefore, the commodities handled by them consisted mainly of raw materials. This structure has not been changed basically up to today. They depend entirely on energy and the raw materials industry, so their organization and personnel are also firmly bound up with this structure and there is no room for advanced technology to enter at present.

The second reason is the fact that the makers themselves are engaged not only in production but also in acquiring technology. The advanced technology information provided by the trading companies' network can no longer satisfy the needs of the makers.

Before the war and for a dozen of years afterward, the technical information provided by the trading companies represented by the technology department of Mitsui Bussan was still highly effective. Since then, the only notable achievements made by the trading companies has been the importation of semiconductor manufacturing equipment carried out mainly by subsidiary companies. Today, the larger the maker is, the less likely will it be to lend its ear to the trading company's information.

The third reason is the consciousness of the leaders of the trading companies. Establishment of a technology department or an office is fine in itself, but it is not quite clear how far the leaders of the trading companies, who are oriented toward expanding the handling volume, will positively cultivate trade related to advanced technology, which involves a minute handling volume. The leaders of the nine major trading companies are operators of a volume-oriented era. Although they may be able to understand mentally that a terrible era will be upon them unless a shift to the advanced technology field is made, they have difficulty translating this into action. They may be a type of "man of the past."

Ten years ago, 20 million yen a year were said to be required to maintain the technology department of Mitsui Bussan. A department or office requires funds to maintain it once it is established, and no one can tell when an achievement will be made. Therefore, nothing is more wasteful than to keep on maintaining an organization in accordance with the mood of the world called "advanced technology." A person who played a central role in establishing a technology department for a large trading company observed the trading company's excitement of late and commented: "It is just like buying a partimutuel ticket or a lottery ticket." A matter which cannot be simply laughed off.

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SCIENCE AND TECHNOLOGY

SPACE DEVELOPMENT DRAFT BUDGET TOTAL 87,600 MILLION YEN

Tokyo JPE AVIATION REPORT-WEEKLY in English 15 Sep 82 pp 9-10

[Text] The Science & Technology Agency requests ¥87,600 million in FY 1983 disbursement and ¥55,755 million in appropriation in subsequent years for space development programs, including the start of development work for the No. 3 broadcasting and No. 5 engineering test and other satellites. The requested funds are almost the same as approved in FY 1982.

Satellite-related funds out of the budget request total ¥35,958 million, including ¥4,900 million for development of the No. 3 geostationary meteorological satellite for launching in FY 1984, ¥12,000 million for developing the No. 1 maritime observation satellite for launching in FY 1986, ¥960 million for starting development of the No. 1 earth resources satellite ¥10,840 million for launching the No. 2 b communications satellite and the No. 2 a broadcasting satellite in FY 1983, ¥680 million for starting development of the No. 3 a and b communications satellites for launching in FY 1987 and 1988, ¥20 million for starting development of the No. 3 broadcasting satellite, ¥768 million for starting development of the engineering test satellite V for research on geostationary three-axial control satellites and mobile communication tests, ¥120 million for considering participation in U.S. space station programs, and ¥1,210 million for developing the first space material testing system.

Funds for development of satellite-launching rockets aggregate ¥34,223 million. The agency plans to continue in FY 1983 development of the N-II and H-1 rockets. The H-1 is designed to launch a 550-kilogram geostationary satellite. A two-stage H-1 would be test fired in FY 1985 and a three-stage model in FY 1987. The agency would also try to improve the thrust of the H-1.

Funds earmarked for the National Aerospace Laboratory's space development study total ¥838 million, including ¥91 million for research into a rocket fueled by liquid oxygen and hydrogen, and ¥64 million for study of basic satellite technology.

CSO: 4300/001

ELECTROGYROCATOR IN AUTOMOBILE INTERNAL NAVIGATION SYSTEM

Tokyo JIDOSHA GIJUTSU in Japanese May 82 pp 528-534

[Article by Katsutoshi Tagami, Tsuneo Takahashi, and Fumitaka Takahashi: "Internal Navigation System for Use in Automobiles 'Electrogyrocator'"]

[Text] 1. Introduction

The spectacular advancements in automobile technology together with the accompanying rapid development of the highway environment in the past have resulted in rapid advances in motorization, and the automobile has proven to be a transportation medium providing a "faster and more comfortable means for going anywhere one wishes" that offers a high degree of freedom motor capability, optionality, extreme rapidity, and convenience, and it will continue to play an important role in our lives even from here on.

On the other hand, the recent large increase in automobile traffic and expansion of the motoring sphere have been accompanied by a situation in which the highways and the traffic situation make it difficult to exploit fully the convenience that can be provided by the automobile. When compared to the railway as a means for overland transportation, the automobile provides the driver a means of locomotion which has much greater degree of freedom. On the other hand, the so-called "navigation method" for searching for a good route to follow is completely dependent on the experience of the driver, intuition, or highway signs and markers. There are often cases of losing one's way and needless waste of fuel as a result of taking one of the side roads intermingled with the concentration of main highways, taxing the driver's physical and mental capabilities, losing a lot of time and resulting in great energy loss in a situation that has persisted from the past.

Only now are the ships which ply the seas beginning to switch from their former dependence on the sun and the stars as navigational aids to a new navigational method based on electronics, while jumbo jets equipped with "inertial navigational equipment," an application of the gyro and electronics, are daily crossing the Pacific and arriving at their targeted destinations. On land, man has progressed from "walking" to "riding," and he arrives at his destination through the use of signs and guideposts; however, the information collection technology for determining one's location when in an automobile is still at a stage that resembles primitive man's use of broken tree branches or piles of stones to mark the way.

In an effort to enable the automobile to continue to develop from here on as a convenient means of transportation in our daily lives, research is underway in various countries to improve the efficiency and rationality of use of automobiles from the combination of man, automobile, and environmental system; the use of various types of information relating to automobiles and of inductive systems is an example. On the other hand, many of these systems require fairly large equipment or facilities as well as social consensus, and they will require considerable time before they become practical. With this background, the "inertial navigation system for automobile use" was developed as one approach to respond positively to users' needs and provide the possibility of expanded functions for use by automobiles.

2. Aim of the Development

A navigational means which does not depend on passive reception of information from an external source such as a radio station but allows operation over a known course and also allows a choice of course with changes in the situation according to highway and traffic conditions through the installation of an auxiliary device on motor vehicles is the "inertial navigation device" which is found on some buses. If such a device were installed on an automobile, back roads could be avoided and the optimum or shortest route to the destination could be selected, thereby naturally preventing energy loss and improving the overall motor efficiency. Furthermore, a person woefully lacking in knowledge of geography could safely drive over unfamiliar roads or at night, and the functions of the automobile could be greatly expanded beyond those of the past.

This device does not depend on external facilities or unstable phenomena such as the earth's magnetism. As a result of the technological pursuit of the practical use of a completely self-navigational method for automobiles, the following are at hand:

--Practical sensing technology for sensing changes in the automobile's direction through the use of a high-precision and high-performance gas rate gyro and sensor performance correction through computers

--A man-machine closed loop system structure with route track display of high information display capability on the route being taken and transmission color map display

--Joint use of a self-compilable special-use map and erasable special pen with high degree of utilization.

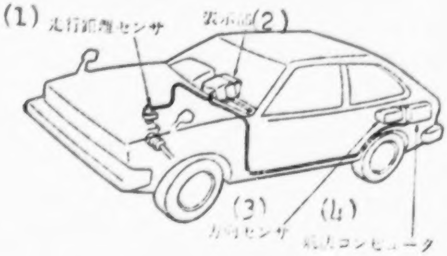
These are the foundation of the judgment aid for course selection to adapt to changing situations; the facility will show where the trip started, the present location, and the direction to take toward the destination; this is a facility that has been assembled to enable ready utilization anywhere, anytime and anybody.

3. Facility Makeup and Principal Specifications

This facility detects the "direction" and "distance" an automobile travels through a precise gas rate gyro sensor and distance sensor; the many changes which occur during the operation are instantaneously integrated by computer and continuously recorded and computed so that the total movements of the vehicle can be extracted and displayed on a Braun tube upon which a transparent route map is imposed which shows accurately the route to be traveled. That is to say, the course of the vehicle and the road to be traveled are clearly displayed on this map.

Functionally, this unit has the same functions as the inertial navigation device on large passenger aircraft (for example, the Boeing 747), which does not use the earth's magnetism or a radio, as a result of which the effects of these external disturbances are not received; the immediate position is determined by one's own capabilities in this inertial navigation device for automobile use. The inertial navigation device used for aircraft detects the acceleration in three orthogonally intersecting directions, and the information is integrated twice to calculate the position on a three-dimensional position coordinate scale, after which the results are converted to the inertial coordinate system to display the immediate position. In the case of an automobile, the distance traveled is readily calculated from the rotation of the tires and travel is limited to roadways, so all that is necessary is to determine the distance from a planar road map or, what is equivalent, a two-dimensional coordinate system.

The use of this facility in an automobile is shown in Figure 1, the display state with map in place is shown in Figure 2, and the basic makeup of the facility is illustrated in Figure 3.



Key: 1. Trip distance sensor
2. Display section
3. Director sensor
4. Navigational computer

Figure 1. Use of Facility

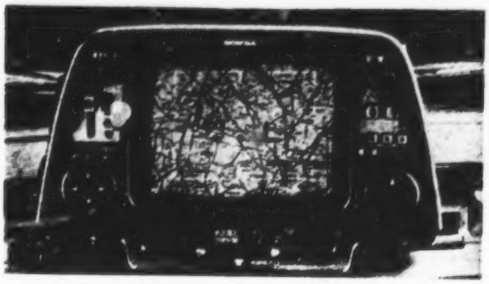


Figure 2. Display State With Map Sheet Inserted

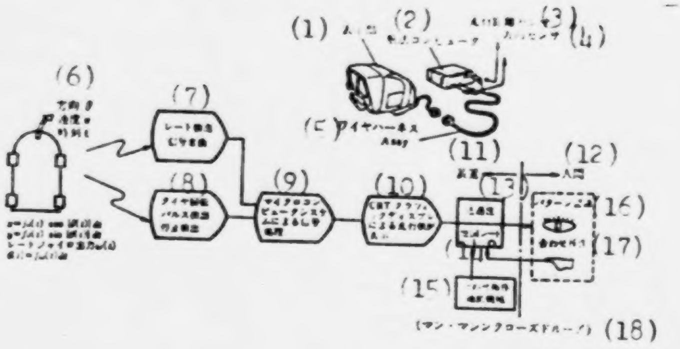


Figure 3. Basic Makeup Diagram of Facility

Key:

1. Display section
2. Navigational computer
3. Trip distance sensor
4. Direction sensor
5. Wire harness assembly
6. Direction θ, speed v, time t
7. Rate detection signal conversion
8. Tire rotation pulse detection, stop detection
9. Signal treatment by microcomputer
10. Key route display by CRT graphic
11. Facility
12. Man
13. Transparency
14. Map sheet
15. Combined driving aid machine
16. Pattern recognition
17. Combined operation
18. Man-machine closed loop

One of the features of the basic makeup of this facility is the combination of the trip route display and the transparent color map which comprises the man-machine closed loop system. When the present location obtained from the results of the navigational calculations is displayed as a point information display and there is an accumulation of errors in coordinates due to errors in direction detection, distance detection, initial position, or map precision, a different position may be indicated on the map with its complex and intimately linked road network, the operator may be confused in trying to decide whether the system is in error or whether the automobile is actually at the location indicated. When a trip taken in the past between precisely fixed points is displayed continuously on the same map at the same time, it is possible to compare the trip route and the road system even though the present position is not on the trip route so that it will be possible to determine readily which route one's own car is on as well as to display the long-term integrational error from the starting point utilizing a feature unique to the inertial navigational principle.

The principle specifications of this facility are listed in Table 1.

Table 1. Principal Specifications of Facility

Display	P 31 fluorescent 6-inch CRT Effective size of display 80 mm x 100 mm Length of trip route display 80 mm MAX Variable scale range $\frac{1}{7,000} - \frac{1}{400,000}$
Computer	16-bit microprocessor (8-bit external bus) ROM 10 KB SRAM 1 KB DRAM 16 KB
Trip distance sensor	8-pole magnetic rotating hole IC pickup
Direction sensor	Gas rate gyro sensor (helium gas) Detection range -70°C/sec - +70°C/sec Output sensitivity 5V/100°C
Map	0.1 t lumilar film transparent multiprint offset printing sheet Sheet size A 5 Basic scale $\frac{1}{250,000}$
Electrical power supply	DC 12-V automobile battery Current consumption average 3.5 A (preheating time 12 A MAX)
Weight	About 9 kg
Operating temperature range	Display section -30°C - +80°C Computer -30°C - +60°C Trip distance sensor -30°C - +120°C Direction sensor -30°C - +60°C

4. Principal Constituent Parts and Features of the Construction

4.1 Trip Distance Sensor

The trip distance sensor uses a pulse detection method to generate electrical signals in response to the rotation of the tires and instructs the computer on the distance traveled by the car. At the same time, this pulse detection also serves to detect the car when it is stopped as well as the distance traveled.

The sensor counts the tire rotations through the number of rotations of the speedometer cable by temporarily disengaging the speedometer cable from the takeout hole in the transmission section and inserting and connecting a hole element type rotation detection unit.

In order to enhance reliability and detection resolution, a noncontact type detection using a hole element was adopted, and eight pulses are generated per cable rotation.

The external appearance of the trip distance sensor is shown in Figure 4.

Figure 4. External Construction of Trip Distance Sensor

4.2 Direction Sensor

The direction sensor is a precision gyro, with helium gas sealed in and no moving parts, which responds very accurately to changes in direction of the vehicle and generates electrical signals to instruct the computer in the direction of travel.

This is a self-reliant navigational system which does not depend on external installations or the earth's magnetism--which are sources of unstable information--but calculates its current position through its own capabilities; the introduction of a yaw rate gyro of high performance and high precision was tested as a direction information sensor. As the result of these studies, a gas rate gyro was selected as the gyro best suited at the present time as practical for use as an automobile part.

This gyro is comprised of a main section in which are enclosed a helium gas circulating pump, injection nozzle, and flow sensor in a single package, along with a constant temperature chamber section to maintain the above members at constant temperature and a control circuit section, all of which are put together in a compact package. An external view of this gas rate gyro is shown in Figure 5.

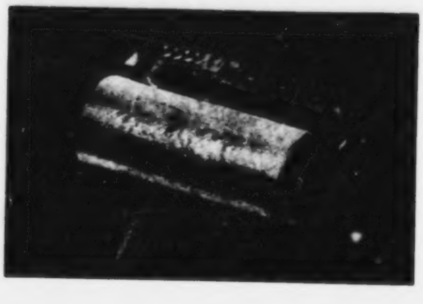


Figure 5. External Construction of Gas Rate Gyro

As illustrated in Figure 6, the makeup of this gas rate gyro includes a spin vibrator type pump to circulate helium gas, an injection nozzle to generate uniform helium gas flow, and two heated wires to detect any aberration in this flow. A block diagram showing the different functions of the gas rate gyro is shown in Figure 7. When the vehicle is proceeding directly forward helium gas reaches these two wires equally so that the temperatures of the two wires remain the same, but when the vehicle changes direction there is imbalance in the flow of helium gas and a temperature differential is created between the two wires. This temperature differential is detected as an electrical output, and the change in direction of the vehicle is sensed.

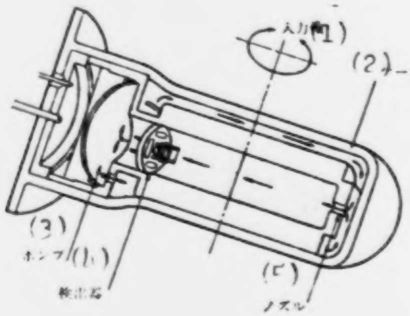


Figure 6. Construction of Gas Rate Gyro

Key:
1. Input axis
2. Case
3. Pump
4. Detector
5. Nozzle

As is evident from the basic principle discussed above, it is important just how the temperature balance between the two heated wires is maintained when the car is maintaining a straight forward course in order to realize high precision and high performance. If there is an imbalance in this temperature, there will be a temperature differential even when the car is on a straight course, and a signal will be generated each time the vehicle changes direction. At the same time, a construction which facilitates finishing operations and mass production is important along with the transfer of this high precision and high performance to operations in the automobile environment.

Systematic pursuit of limits and tradeoffs were made until these various factors could be incorporated in the details for the various sections, such as a double constant temperature tank construction, sensor section, and circuit section, and thereby establish a practical technology for a rate gyro for use in automobiles while, at the same time, this product represented spectacular improvement along the lines of its specifications.

The sensitivity characteristics are shown in Figure 8, and the stability with time property of the no input-output voltage is shown in Figure 9.

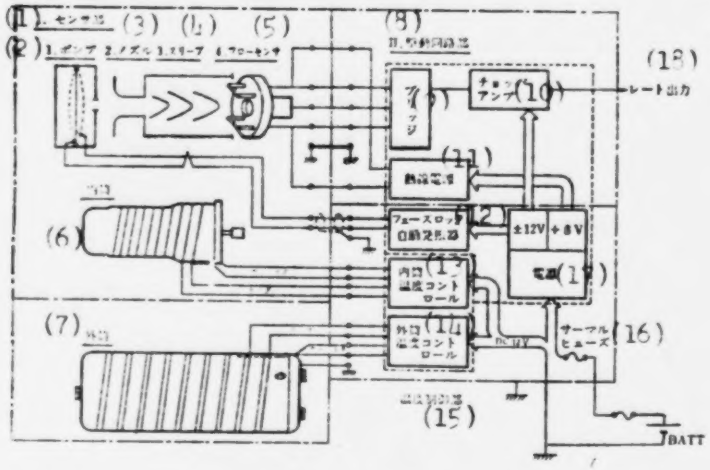


Figure 7. Block Diagram of a Gas Rate Gyro Showing Different Functions

Key:

1.	Sensor section	10.	Chopper amp
2.	Pump	11.	Power supply for heated wires
3.	Nozzle	12.	Phase lock self-excited oscillator
4.	Sleeve	13.	Inner tube temperature control
5.	Flow sensor	14.	Outer tube temperature control
6.	Inner tube	15.	Temperature control section
7.	Outer tube	16.	Thermal fuse
8.	Drive circuit section	17.	Power supply
9.	Bridge	18.	Rate output

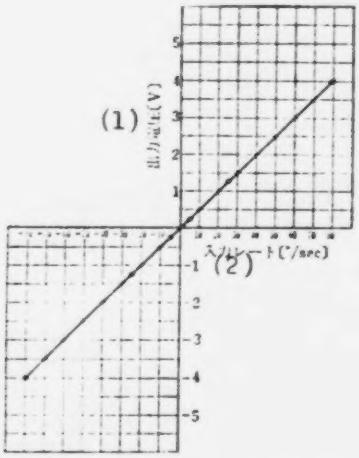


Figure 8. Sensitivity Characteristic of Gas Rate Gyro

Key: 1. Output voltage (V) 2. Input rate (°/sec)

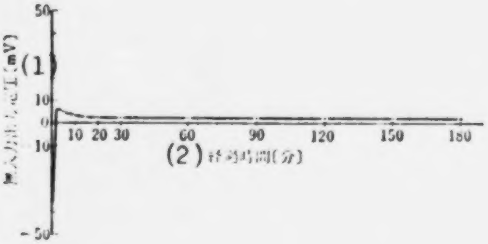


Figure 9. No Input-Output Voltage Stability of Gas Rate Gyro

Key: 1. No input-output voltage (mV) 2. Elapsed time (min)

4.3 Navigational Computer

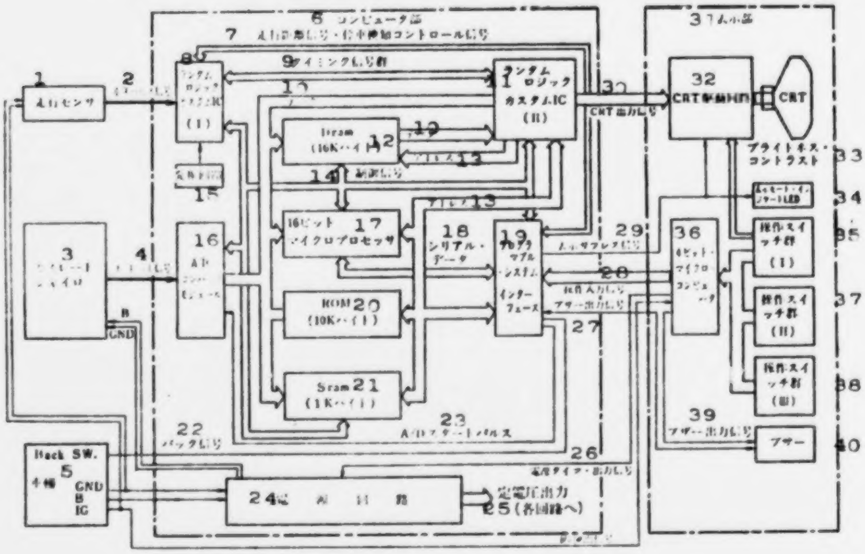
The computer successively calculates the present position from the electrical signals on direction and trip distance and makes a display of the trip course derived from these signals by reference to the stored two-dimensional coordinate data table. Unlike the general-use computer of the past, this computer takes in much more precise electrical signals, while the navigational computer treatment includes many integration operations and repeat calculation elements, so that a high degree of accuracy is required to keep cumulative errors in the calculations from becoming a problem. At the same time, together with this highly accurate treatment, there is need for high-speed treatment so that the latest data can always be at hand relative to the successive movements of the automobile.

A computer to be used in an automobile should incorporate cost, reliability, and shape features which are in the range of practicality with high-precision and high-speed hardware and software; the initial type tested was an 8-bit external bus type 16-bit microprocessor and multitask monitor type software.

An external view from the printed base plate installation side of a computer unit is shown in Figure 10. This unit is constructed so that the computer printed baseplate and the power supply printed baseplate are each detachable from both sides of the cover. The computer printed baseplate is where the 16-bit microprocessor is tied in with ROM, SRAM, and DRAM as well as an 8-bit external bus, and the peripheral circuitry is mostly made up of two sole-use IC's to miniaturize the unit. The A/D conversion circuit section is molded into the metal case and is in the form of a sole-use module to enable high-precision stability even in the environment of a car.

The makeup of the computer system is illustrated in Figure 11 in the form of a block diagram. The following constitute the principal contents.

Figure 10. External View of a Navigational Computer



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CRT
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Sram
ROM
Back SW.
GND
B
IG
A/D

Figure 11. System Block Diagram

Key:

1. Trip sensor
2. Vehicle speed pulse signal
3. Gas rate gyro
4. Yaw rate signal
5. Wheel
6. Computer section
7. Trip distance signal, stop detection control signal
8. Random logic custom IC
9. Timing signal group
10. Data
11. Random logic custom IC
12. DRAM (16 kilobytes)
13. Address
14. Control signal
15. Oscillation circuit
16. A/D converter module
17. 16-bit microprocessor
18. Serial data
19. Programmable system interface
20. ROM (10-kilobyte)
21. SRAM
22. Back signal
23. A/D start pulse
24. Power supply circuit
25. Constant voltage output (to each circuit)
26. Power supply timer output signal
27. Buzzer output signal
28. Operating input signal
29. Display suppress signal
30. CRT output signal
31. Display section
32. CRT drive circuit
33. Brightness contrast
34. Display mode indicate LED
35. Operating switch group (I)
36. 4-bit microprocessor
37. Operating switch group (II)
38. Operating switch group (III)
39. Buzzer output signal
40. Buzzer

1) Successive direction of travel angles are calculated for the automobile from the unit distance traveled signal from the trip distance sensor and the yaw rate signal from the direction sensor, and the present position on a two-dimensional coordinate is calculated successively to construct a data table of trip distance coordinates for a fixed distance.

2) The coordinate array recorded on the data table can be expanded, reduced or rotated in the graphic treatment of the route traveled.

3) Reception and treatment of operating command signals.

4) Automatic correction of zero point drift of the direction sensor at the time the automobile stops.

5) Self-diagnostic treatment of the system and message display.

4.4 Display section

The display section picks up signals from the computer to display the trip trace, present position, and the direction headed by the automobile on a 6-inch Braun tube.

The factors which must be taken into account before placing a CRT (cathode ray tube) display device in an automobile are the following:

1) It must be large and its field of vision must not be obstructed. This layout involves maximum suppression of overall height of the display, and taking the display area of a practical nature into account, a 6-inch Braun tube placed sideways was adopted.

2) The brightness of the display must not be inferior to the surrounding brightness. The brightness of the Braun tube was increased, and hood and expanded lens type installations were made to minimize direct solar rays in order to bring the brightness to a practical level. At the same time, a neck turning mechanism was installed so that the viewer can obtain an optimum field of vision and operation.

3) There must be no hazardous situation even when the automobile is involved in an accident. The front of the display section is padded with an external structure using soft cushioning material, and the operating switches and levers are of a collision free form. Even if the Braun tube should be shattered through a possible accident, a protective acrylic plate placed over the front surface will prevent broken pieces from being scattered. In addition, the construction provides considerable shock-absorbing capacity.

The various operating systems of this facility are shown in Figure 12. The entire assembly is deployed at the periphery of the display section. An external view of the structure is shown in Figure 13.

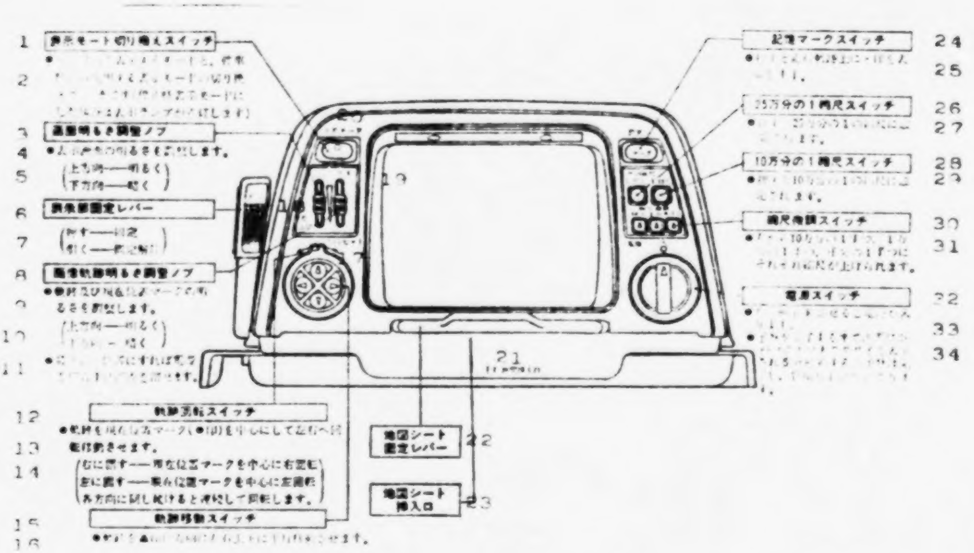

Figure 12. Names and Functions of the Different Operating Systems

Key

1. Display mode switch
2. This switch enables change from normal operating mode to the display mode for use when the vehicle is stopped. (The display lamp goes out in the stopped mode.)
3. Picture brightness knob
4. Adjust picture brightness
5. Up: brighter, down: dimmer
6. Display section fixing lever
7. Press: fixed, pull: released
8. Knob to adjust brightness of track on picture
9. Adjusts brightness of track and present position
10. Up: brighter, down: dimmer
11. Lowest position eliminates the picture without cutting off the power supply
12. Track rotation switch
13. The track can be rotated left-right with the mark of the present site (· mark) as center
14. Rotate right: rotation to right with present site mark as center
    Rotate left: rotation to left with present site mark as center
    If knob continues to be turned, the picture will continue to rotate
15. Track translation switch
16. Makes left-right, up-down parallel translation of track in the direction of the Δ symbol
17. Direction setting
18. Display cutoff
19. Picture brightness
20. Display mode
21. Map insertion slot

[key continues]

[Key to Figure 12 continued]

22. Map sheet fixing lever
23. Map sheet insertion slot
24. Function mark switch
25. Press this and leave a · mark on the picture
26. 1: 250,000 reduction switch
27. Reduces scale to 1: 250,000
28. 1: 100,000 reduction switch
29. Reduces scale to 1: 100,000
30. Fine adjustment of scale switch
31. Starting from the left, the scale is raised by 1/100,000, 1/10,000 and 1/1,000
32. Power supply switch
33. Turn 90° to right to put power supply on
34. There is a "Please wait a few minutes" display until preheating is complete; preheating is completed in 5 minutes to bring the system to operating state

Figure 13. External Construction of Display Section

There is also a switch which is used rather infrequently but nevertheless has an important function which is placed on the display section side, and it is provided with a cover to prevent inadvertent touching. There are, in addition, a timer switch which allows the functions of each switch to be continued a maximum of 90 minutes after the IG switch has been cut off, a distance correction switch for use when the tire size is changed, a sensitivity adjustment switch for the direction sensor, and a track erasing switch--all of which are provided to facilitate maintenance.

An external view of the switch deployment on the display section side is shown in Figure 14.

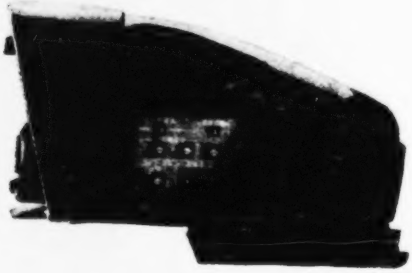

Figure 14. Switch Deployment on Side of Display Section

4.5 Special-Use Map Sheet and Pen

The special-use map is divided into blocks, and assembly of all the blocks will cover the whole country. This map is created by offset printing using multicolor ink on transparent polyester film; it is colored taking into account its adaptability to the automobile cabin environment and ready readability, while overlaps are provided at the edges to enable easy switchover to the next map block panel.

The degree of freedom in the utilization of these maps is enhanced by allowing the operator to select only the maps he needs, placing o marks on target sites, tracing the planned course with a special marking pen, and selecting only the necessary maps for use to be put away in a carrying case.

The marking pen is an erasable type whereby erasures can be made by the use of the eraser at the opposite end from the marking point, the eraser can be exposed by removing the cap.

Special-use maps and pen are shown in Figure 15.

Figure 15. Special-Use Maps and Pen

5. Examples of Application

5.1 Utilization Effect

This facility was used in actual operation evaluation tests, user monitor tests, and tests involving the complex road systems of congested urban centers, local roads removed from trunk highways, high-speed highways, and mountain roads, and some difficulties were encountered in the manner of handling these map sheets. The following are the principal items in the evaluation that was made.

There is great feeling of safety in unfamiliar territory where anxiety can be great. When unexpected tieups due to construction are encountered, a quick detour can be made following the behavior of the local drivers.

When on a long trip, the shortest course or the optimum course can be selected en route, thereby greatly easing driver fatigue and saving time and fuel.

When a wrong turn is taken, the error is detected immediately, enabling quick corrective measures.

At night in an area where no signs of markings are evident and there is no one familiar with the area, uneasiness is eased, and the facility plays the role of a guide.

5.2 Development of a Utilization Method

This facility is used not only as a means to indicate present position on a road map, but a very wide field of applications is anticipated. The following are some examples.

--The starting points and roads recorded on the Braun tube can be used as guides for reference independent of the road map.

--A tour around a certain installation will give one knowledge of the area and the shape of the district.

--Detailed knowledge can be obtained of road conditions in mountain and remote areas shaded by trees making aerial photographs inadequate.

--By copying the trip track with a special pen or camera, a record can be prepared for patrol use or business delivery route use.

In this manner, various needs can be fulfilled and new applications can be developed according to the user's ingenuity.

In addition, it is possible to use a transparent sheet on which has been placed relevant information from commercial road maps in place of the special maps, and the results will still be satisfactory.

5.3 Precision of Trip Track

The precision of the trip track display will vary considerably with the course traveled and the speed distribution during the trip, making simple quantitative definition difficult. The ultimate positional error is greatly controlled by just how the errors of the various constituent parts are woven into the errors generated by the course and speed distribution. This facility makes correction by computer for these errors by compiling the various factors with a common degree of influence on the precision in the trip track for use in the correction.

The precision is very high where the route is comparatively straight, travel is through a section of many traffic lights, or roads where left and right turns occur alternately in a repeated manner. On the other hand, travel over high-speed highways where there is no occasion for stopping and the drive continues uninterrupted for long hours or travel over mountainous roads with large turns and large map deformations results in low precision. This precision problem is fairly minimal from a practical viewpoint on these highways and mountain roads with very few branching roads.

Model examples of travel over general roadways are shown in Figures 16 and 17.

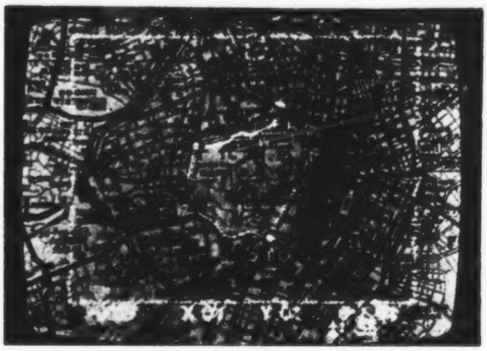

Figure 16. Example of Travel Over General-Use Roads (circuit trip

The Imperial Palace was circled following the moat, and return was made to the starting point

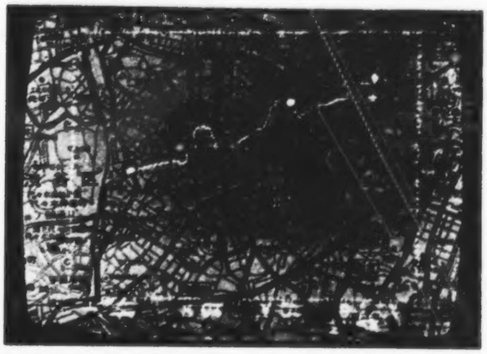

Figure 17. Example of Travel Over General-Use Roads (from departing point to destination)

Leaving home, the Diamond Hotel in Chiyoda-ku was the destination via Shingu

6. Concluding Statements

This facility was designed to test the practicality of an inertial navigation system for automobile use, and it is believed that regarding the function, it has demonstrated to a certain degree the ability to respond to the user's needs and, at the same time, it has been shown to possess potential for a wide range of other technological applications. This "navigational" function is almost nonexistent in automobiles compared to aircraft and ships, and it is one of the necessary items for future utilization of automobiles which needs to be developed. We anticipate that this facility will be an aid to raising the curtain on the age of navigational automobiles.

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20 December 1982

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No. 163

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POLITICAL AND SOCIOLOGICAL

PROSPECT FOR LDP, ELECTIONS ASSESSED

Tokyo SHUKAN DAIAMONDO in Japanese 13 Nov 82 pp 26-30

[Article by Dokkyo University Professor Rei Shiratori: "A Scenario for Great Political Turmoil"]

[Text] Why Prime Minister Suzuki Resigned

The announcement of Suzuki's resignation on 12 October may have appeared rather sudden to the public but there may be logic to it. The direct cause of his resignation could be to avoid being asked to resign by the unanimous decision of the Supreme Advisory Council of the Liberal Democratic Party.

Ironically, all members of the council--made up of former prime ministers and chairmen of both houses--are in fact either nonmainstreamers or antimainstreamers. In view of the council meeting coming up on the 14th, it is believed the direct reason for resignation was that he decided that it would be impossible to reject the resignation request and continue holding onto the power. That is why, Suzuki gave "harmony of the party" as his No 1 reason for resignation.

From the economic and financial situations, it can be assessed that, as a political leader, Suzuki showed minimal sound judgment in looking at situations objectively and making decisions according to his own capability.

If he announced his resighation to avoid being asked to resign by the council, a serious self-examination of the present new leaders of the LDP would be demanded. As known previously, the Suzuki Cabinet lost the support of the people and reached the end of the road as far as policy is concerned. The deficit exceeding 5 trillion yen expected by the end of this fiscal year had already been discussed by the Budget Committee in June and the recent public poll showed that nonsupporters of Suzuki outnumbered the supporters by almost twice.

Under these situations, the so-called new main leaders of the LDP should have determined the situations objectively and turned the political situation around earlier in response to the voices of the people. If that had been done, the recent confusion may have been averted.

Preliminary Election--Narrow Margin Between 1st and 2d

After Suzuki's resignation announcement, the internal activities of the LDP vacillated in a very complicated form. First of all, the three main factions of Suzuki, Tanaka and Nakasone came out with the need to follow up on the administrative reorganization of the Suzuki's administration, and secondly, to support Nakasone, director of the Administrative Management agency, on the logic that a political vacuum should not be permitted from the economic and political situations.

Regarding this, the three antistream factions of Fukuda, Kawamoto and Nakagawa, in the first place advocated that the administration of the mainstream faction has come to a standstill in policy and political posture which led to Suzuki's resignation; therefore, a turnaround of the entire political posture and policy is more essential than anything else. Secondly, they insist that since Suzuki's resignation came after the LDP's preliminary presidential election date was set, a closed door election of a leader should be abolished and the preliminary election should be held.

This confrontation between the mainstream and antimainstream factions turned into a confrontation of two organs regarding either: elect the presidential successor through coordination of the four-member executive council made up of the LDP president, secretary general, chairman of the Political Affairs Research Committee and chairman of the Executive Council or election by the Supreme Advisory Council. However, as long as both factions do not approve of basic negotiations, a solution by negotiations will not materialize and will end in failure, thus a move was made toward accepting candidates for the preliminary election to be held on Saturday the 16th based on the understanding that no campaigning would be conducted during the 1 week of talks.

Four candidates for the preliminary election to start from 10 am of the 16th were accepted: Nakasone as a unified candidate of the mainstream faction and Kawamoto, Abe and Nakagawa from the antimainstream factions. The 1-week negotiation appeared to have produced a compromise proposal of splitting the president and prime minister by putting up Nakasone as prime minister and Fukuda as president, but ironically, the proposal was rejected by candidate Nakasone who wanted to negotiate. The negotiation ended early on the 23d and they decided to jump into a preliminary election without going through the campaign process.

A future scenario cannot be determined at the present stage. However, various scenes can be imagined.

The first scene of the scenario is the prelimnary election and the second scene is the main election of Diet members of the LDP and Liberal People's Council and the third scene is the designation of prime minister by the Diet.

Two situations can be given for the first scene of the preliminary election. First is when Nakasone attains the No 1 position and another is when Kawamoto becomes No 1 and Nakasone No 2. Voters in the preliminary election will consist of LDP party members and members affiliated with the Liberal People's

Council, an ally of the party. Various predictions surrounding the 1.04 million votes from these members are being made.

It is generally said that Kawamoto will receive 300-400,000 votes; Nakasone, Suzuki and Tanaka factions between 150-200,000 each; the Fukuda faction with less than 150,000 and the Nakagawa faction around 70,000, and if these are added, Nakasone will definitely outnumber Kawamoto. But in actuality, Nakasone is the only mainstreamer and Kawamoto, Abe and Nakagawa are anti-mainstreamers.

The first problem to be considered is the outcome of this 3-to-1 ratio.

The second problem is that the tallying method used in the preliminary election between Fukuda and Ohira in 1978 was a two-stage method where a candidate receiving most votes in various prefectures can carry the entire votes of those prefectures and add them to the national total, but in the coming election, mail-in votes coming directly to the party headquarters are tallied as they come in. Since the number of votes for which candidates and from which prefectures is not known, factional pressure as a whole will weaken.

The third problem of Nakasone is that there is considerable distrust against him especially on defense policy on the part of a large portion of the Suzuki faction--most of whom supported Ohira rather than Suzuki. There is also opposition against his political stance known as the "weather vane" among the party members and allies of the Tanaka faction because Nakasone joined the Miki faction during Miki's administration at which time the arrest of former Prime Minister Tanaka took place.

Therefore, assuming that Nakasone receives 150-200,000 votes, the Tanaka faction, in actuality, will receive two-thirds and Suzuki about half of the firm votes. On the other hand, there is a possibility of Kawamoto's strategy at the final stage to have both Nakagawa and Abe as candidates and instruct the supporters to vote for Kawamoto to preserve his influence, and at the same time, secure an advantageous position in the next administration.

In the first scene of the preliminary election, the difference in the number of votes secured is expected to be small, whether Nakasone or Kawamoto is elected.

If Nakasone wins in the first scene, Kawamoto may decline his candidacy in the second scene of the main election. Consequently, Nakasone, more likely, will be elected unanimously as president of the party. Even if Kawamoto remains in the second scene, Nakasone will still be elected by nearly a two-thirds majority. In that event, the LDP will become unified and Nakasone should be elected in the third scene, a designation of prime minister by the Diet. If the scenario follows as given here, Nakasone's political posture, especially the hard line hawkish posture on defense and diplomacy, and moreover, the support and influence of the Tanaka faction, will lead to unified opposition parties' confrontation against the Nakasone cabinet.

In 1983, a statement of the prosecutor's office and also a decision of the court will be handed down on the Lockheed case involving Tanaka. If at that time, the opposition parties call for a vote of no confidence, the antimainstream factions probably will not be present to vote because of possible political implications. Even though this may not happen, the difficulty of obtaining national support on the tough defense and diplomatic posture of Nakasone, in view of the strong public opinion on the decision of the Lockheed case and military reduction, will make the LDP reduce the number of candidates in the House of Councilors election. The entire antimainstream factions will then tackle the political responsibility of Nakasone who will be forced to step down.

Next, Cabinet to Last Only Till Next July

On the other hand, if Kawamoto wins first place in the preliminary election, he also will win by a slim margin. Nakasone had already made clear that he will run in the main election even if Kawamoto wins in the preliminary election. A race between Kawamoto and Nakasone will ensue among the LDP affiliated Diet members. In that case, Nakasone will be elected as president of the LDP through the support of three mainstream factions which make up nearly two-thirds of the Diet members. However, since Kawamoto led in the preliminary election in this instance, he can become a candidate for prime minister to be designated by the Diet.

There is a possibility in such a situation that sufficient votes from the opposition parties will go to Kawamoto in the third scene. Makieda of Sohyo announced his support of Kawamoto in this situation and chairman Sasaki of the LDP is going along with support for Kawamoto. Tagawa, a representative of the New Liberal Club, expressed support for Kawamoto from the stand of anti-financial influence and anti-Tanaka. The same can be said of the Social-Democratic League.

When that occurs, the idea of a split president and prime minister with Nakasone as president of the LDP and Kawamoto as prime minister will become a reality. Whether President Nakasone, who will be in control of the mainstream factions, is able to purge Kawamoto and the rest is out of the question; therefore, the LDP, in essence, will end with two political parties.

As for Prime Minister Kawamoto, who will be faced with a two-thirds opposition within the LDP, a possibility of a vote of no confidence will arise due to economic and political problems, especially on the National Personnel Authority problem and may, by chance, encounter extreme administrative difficulties. If the House of Councilors election takes place in July with split parties, a peculiar situation of voting for one LDP member, although there will be two, will arise because of the restricted roster system of proportional representation in the national constituency. Defeat for the LDP can be predicted and the Kawamoto cabinet will be pressured by the Nakasone mainstream faction to bear the responsibility and resign.

Whether the scenario ends with the first scene or the second scene, the next cabinet will last only until next July.

Four Factions Leading To Split of LDP

During the adjustment prior to the preliminary election, the influence of Tanaka diminished and the influence of Fukuda also dropped because he chose to run for presidency during the negotiation. If either Nakasone's or Kawamoto's regime ends by July's House of Councilors election, the LDP will enter an age of new leadership for the first time, and at that time, a relatively long-term administration--lasting 2 years--will emerge. When this occurs, the LDP will be controlled by the people who kept quiet in one form or another until now, such as Miichi Miyazawa, Noboru Takeshita and unsuccessful candidates Abe and Nakagawa.

A major overall change in the framework of the party politics and a political reorganization are less likely from the preliminary election to the House of Councilors election. Secretary-general Yamaguchi of the New Liberal Club talked of a concentration of moderates, but the internal structure of the club is far from being united.

The New Liberal Club approved in form the restricted roster system of proportional representation in the House of Councilors last year but Yohei Kono is opposed to it and abstained from voting in the House of Representatives. The leaders of the New Liberal Club indicated that the solidification of the club is more important than the reorganization or concentration of moderates, and since the club in essence is conservative, it is quite unlikely that it will join with Shaminren (Social-Democratic League) which is aiming toward a new socialism in the form of revision or reform.

The Komeito (Clean Government Party) made known its basic and independent alignment when the New Liberal Club approved [proportional representation] at the last year's House of Councilors election. Ten years from now, a concentration of moderates may come about, but the possibility of this happening in the near future is even more remote than last year.

Except, there is a part which can change the political structure. With the adoption of the restricted roster system of proportional representation by the House of Councilors national constituency, a reinforcement of groups from the New Liberal Club, Social-Democratic League, nonpartisan and Ichi-no-kai of the House of Councilors is possible in the House of Councilors' national constituency.

Basically, however, they are not a concentration of moderates but a form of concentration from the standpoint of restricted roster within the national constituency. While each advocates armament reduction, environmental issues, improvement of women's position, etc., it is believed those with similar claims will join to backup their positions.

Another likely change is the possible split of the LDP if, for example, Kawamoto becomes the prime minister and Nakasone the president. First of all, the size of the LDP has grown considerably but, in contrast, less cohesiveness toward the leaders of the party is seen. During the critical time facing the party, the people acted when it called for unity of the party to preserve the political power but this is not the case now. Since the double elections of 1980, the LDP has occupied a very large number of seats resulting in decreased cohesiveness within the party. At the same time, a certain tacit understanding of forming a single force (political party) by Tanaka alone has emerged gradually.

Second is the tremendous change in the way the people think. In a certain poll, 70 percent of the people responded that if the internal conflicts continue within the LDP, it would be better for the future of Japanese politics to form two political parties and take over the administration alternately. The point that the 70 percent of the people feel that the LDP should be split into two parties will gradually reflect the reality.

Third is that the LDP as a single unit is getting into a more difficult situation even on policy issues. Take the problems of economic recovery or financial reconstruction for example. One method calls for a drastic cut in the income tax to stimulate the entire economy for the expansion of tax revenues. Another way calls for a direct form of higher taxation--income tax. These two methods are being molded gradually into a definite (final) form within the party between the mainstream and antimainstream factions.

Similarly, a certain change in the position on the defense policy has taken place internally. First of all, the worsened financial situation in the United States has placed more and more pressure on the allied nations to shoulder greater defense responsibilities. This means that America wants Japan to increase its defense budget even more, for example, by increasing the budget for the construction of the U.S. military facilities around Misawa Base.

In response to this pressure, an increasing number of LDP members are pushing toward a radical form of defense buildup beyond the framework of 1 percent of the GNP and toward expanding Japan's defense responsibility in the entire area north of the Philippines as insisted on by the United States and not limited to the 1,000 nautical mile sea lanes. But on the other hand, Asian countries including China are becoming more apprehensive toward Japan's greater defense spending and defense buildup. Even though the U.S. request for defense buildup cannot be ignored, the voices within the LDP which call for reduction of armaments if possible because we cannot ignore the Asian voices of apprehension toward Japan's defense buildup are beginning to become more explicit little by little.

Up to now, the Foreign Ministry, being pressured by the United States, doubled up, for example, with the Defense Agency to increase the defense budget, but the Foreign Ministry, hereafter, can no longer ignore the voices of Asia as shown in the textbook issue. It is believed the joint struggle with the Defense Agency to increase defense spending as in the past is not possible anymore.

The statement by Chairman Makieda of Sohoyo, "If unity can be achieved on military reduction, we can join hands with the Liberal Democratic Party" was probably made due to the rising new trend.

The question of military reduction and defense did not affect politics up to now but these issues will become one of the very important motivating powers in politics including the administrative reorganization.

Fourth is the introduction of the restricted roster system of proportional representation in the national constituency. If this system is enforced, a policy unification of those on the same list will become necessary which will mean that it would be more difficult for the LDP to remain split for the election, but there is also a possibility of the LDP splitting from the struggle for ranking and listing on the roster.

Dissolution Within a Year? Deliberate Scheme of Tanaka

From this standpoint, a factor for the split of LDP becomes definitely greater. In that sense, a reorganization of the entire political world may take place if the LDP split. However, the opposition parties' desire for the concentration of moderates and reorganization seem to have cooled off.

The joint regional election in April and the House of Councilors election in early July are expected next year. The results will differ according to the situations, but it is doubtful that the LDP will gain any more seats since the double elections of 1980 when the best results were obtained. If so, they can disregard the short-term situation and not hold the House of Councilors election in 1983.

The 1980 elections produced unexpectedly good results for the LDP and they feel that even if the election is moved up from 1984 to 1983 it will not produce better results. Besides there is no reason for double elections in 1983 at the time of deteriorating economy and restrictive finance. It is advisable for the LDP to maintain its absolute majority in the House of Representatives for the full term.

If the House of Representatives election is needed, it can take place during 1982. That is to say, if Kawamoto leads in the preliminary election and Nakasone receives two-thirds of the votes in the main election to become the president and Kawamoto the prime minister with the support of the opposition parties in the Diet, Tanaka may gamble once more in enforcing the dissolution and call for a general election of the House of Representatives, with the Lockheed decision coming up next year, and even if the LDP retains its absolute majority and Tanaka is judged guilty, the logic of the people that the problem of political responsibility had already been resolved will be upheld.

If the dissolution takes place, a total resignation of the cabinet is of course automatic and Prime Minister Kawamoto's term ends at that point. From that sense, the dissolution will become a good strategy for Tanaka and mainstream factions.

The House of Representatives election is believed possible when the internal strife of the LDP cannot be avoided and when the president and prime minister positions are held separately, and moreover, when the administration is conducted by a portion of the LDP members who become drawn into the opposition side.

The question is whether the present LDP has the energy to go that far or not. In viewing its vision of new leaders turning politics around and its future prospect and strength, the possibility of an early election of the House of Representatives is remote. A more orthodox thinking is to carry out the joint district election and the House of Councilors election as scheduled next year and form a new cabinet under a relatively stable base to formulate the 1984 budget at which time the dissolution of the House of Representatives will take place.

9218
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ECONOMIC

ALUMINUM INDUSTRY'S STRUGGLE FOR SURVIVAL DISCUSSED

Tokyo TOKI NO KEIZAI in Japanese Oct 82 pp 12-17

/Text/ "Crisis"--Is There Any Way the Aluminum Smelting Industry Can Survive?

Rescue Measures That Always Treat the Symptoms

In order to help the aluminum smelting industry, which has been in a serious structural depression, on 16 August MITI decided to take measures that involve commercial banks making 80 billion yen in emergency loans to the aluminum smelting industry in the second half of FY-82 and the government subsidizing the interest on the loans.

As is known, MITI has established the Special Committee on Policy Toward Basic Materials Industries within the Industrial Structure Council in order to reactivate the basic materials industries, which have been in an extreme slump. The committee has started studying comprehensive measures, including enactment of a new structurally depressed industries law in FY-83. In the case of the aluminum smelting industry, however, MITI recognizes that the situation is such that the industry cannot wait until then. In the meantime, MITI has decided to take "stopgap" measures.

The chief measure is an emergency loan to deal with the industry's worsening financial condition in the second half of this fiscal year. MITI has been considering two ways to make the loans. One possibility is to have the Metal Mining Agency of Japan obtain government-guaranteed loans from commercial banks and use the funds to buy 200,000 tons of aluminum ingot from industry inventories for the government stockpile. Another possibility is to have the Metal Mining Agency of Japan borrow money from commercial banks and lend it to the industry with aluminum ingot as collateral. In either case, the government will subsidize interest payments for 3 years (approximately 5 billion yen). As for the FY-82 portion of the interest payments, MITI is hoping to include it in the supplementary budget for FY-82, which is supposed to be compiled this fall. MITI intends to start negotiations with the Ministry of Finance in the near future.

In order to reduce the interest payment burden, which occupies approximately 15 percent of the cost of aluminum ingot (approximately 73 billion yen for the whole industry in FY-81), MITI will ask parent companies and concerned financing institutions to cooperate in deferring interest payments. Moreover, the entire industry's outstanding debt at the end of FY-81 is 900 billion yen. On the condition that MITI will get a promise from the concerned financial institutions to postpone repayment of part of the debt, MITI will ask the aluminum smelting companies to separate operating plants from idle plants and transfer them to second companies. MITI is planning to guide the aluminum smelting industry in such reconstruction measures.

Nevertheless, the aluminum smelting industry is in a serious slump. This is clearly shown in the business results of three aluminum smelting companies (Nippon Light Metal, Mitsui Aluminum Industries, and Mitsubishi Light Metal Industries) for the period that ended in March. Due to a fall in the market for ingot and an increasing inflow of foreign ingot, the sales volumes of all but Mitsui Aluminum have decreased by a large margin. An increase in fixed costs resulting from reductions in production has also affected earnings. Consequently, the three companies are currently in the red. As a result, their cumulative losses have increased. In the case of Mitsubishi Light Metal, the liabilities exceed its capital. The liabilities of Nippon Light Metal and Mitsui Aluminum have reached a point almost exceeding capital. Adding the figures for Sumitomo Aluminum Smelting and Showa Light Metal, whose fiscal years end in December, to the first three companies, the total cumulative losses are 70.1 billion yen, while the total capital of all five companies amounts to approximately 77 billion yen. Since the aluminum smelting industry currently seems to be recording a total deficit of 6-7 billion yen every month, it is obvious that the aluminum smelting industry is virtually where liabilities exceed capital.

The aluminum smelting industry, which was once a leading industry, has fallen into a very depressed position. The primary cause is, needless to say, the high cost of electricity following the oil shock.

Aluminum smelting requires so much electricity that it is called a "can of electricity." Approximately 14,000 kWh of electricity is required to smelt 1 ton of aluminum. In Japan where a lot of electricity is generated by burning crude oil, the average unit cost of electricity for smelting aluminum is 16-17 yen per kWh. It is far more expensive than the 1-2 yen in Canada, where abundant hydroelectric power is available, or the 6-7 yen of West Germany, which generates electricity by burning domestic coal. With a difference of 10 yen per kWh, the cost of electricity in aluminum smelting differs by about 230,000 yen per ton. When the price of aluminum ingot is at most 400,000-500,000 yen per ton, this difference in the cost of electricity is decisive.

Only two plants can compete with cheap foreign electricity: Nippon Light Metal's Kanbara plant, which depends on hydroelectric power (unit cost: 1-2 yen), and Mitsui Aluminum's Omuta plant, which uses electricity generated by burning powdered coal produced in Mitsui's Miike Coal Mine (unit cost: around 9 yen).

The former benefits from the prewar Fuji River hydroelectric power project, and the latter has been continuously burning domestic coal disliked by others.

The combined smelting capacity of these two plants is 200,000 tons a year, slightly more than the 130,000-ton a year domestic capacity to smelt aluminum at the end of World War II. It is not too extreme to say that the history of aluminum smelting has reverted to the prewar situation.

Plunging into a Period of Worldwide Chaos.

There is, however, another big reason for the slump of the aluminum smelting industry: worldwide, the aluminum industry has plunged into a period of great confusion. Until the oil shock, world aluminum ingot prices exhibited a strong color of control by the six aluminum companies called the aluminum majors. The majors like Alcoa and Alcan supplied an overwhelming portion of world aluminum ingot production. With this power in the background, the majors were able to adjust supply and demand in each market and maintain prices at a stable level based on cost. The period in which the price of aluminum remained around 200,000 yen per ton lasted for a long time in Japan, too. Plants were basically located in markets where ingot was consumed. The weight of aluminum trade in the form of ingot as an intermediate material was extremely small.

This system, however, was suddenly shaken with the oil shock. With an increase in the smelting capacities of developing nations in the Middle East and Central and South America, aluminum ingot produced by developing nations had emerged in the international market as a source of disturbance. Because of rising energy costs and siting difficulties, many aluminum makers, including the majors, started smelting in foreign countries. Then, the foreign countries began to make strong demands for participation in aluminum production. In addition, expansion of the gap between supply and demand due to upheavals in the world economy spurred chaos in the aluminum industry.

As these factors compounded each other, the price of aluminum started to fluctuate widely. And aluminum's characteristic as a market commodity similar to copper has been strengthening. The listing of aluminum on the LME (London Metal Exchange) in 1979 was symbolic of the change.

Moreover, the price of aluminum ingot has continued to fall recently. When the Aluminum Subcommittee of the Industrial Structure Council started studying measures to revive the aluminum smelting industry last spring, the opinion that "a capacity of 200,000 tons a year can be saved" was asserted. Now, however, such "optimistic views" have faded. A view that "even a capacity of 100,000 tons cannot survive...." or that the aluminum smelting industry will be totally wiped out has been gaining strength.

When the aluminum ingot market collapsed last spring, prices went down to $1,400-$1,500 per ton at most. But it was expected that the market would bounce back to $1,750 per ton, the Alcan quotation that was the guideline price for aluminum ingot transactions. Under these conditions, concerned sources believed that the Omuta and Kanbara plants with relatively low production costs could survive.

Since then, however, the market has continued to decline. At present, aluminum ingot prices are around $1,000 per ton. Although this price level is too low judging from the production costs of the world's aluminum smelters, people no longer think the price will go back to $1,750 per ton.

Instead, Alcan, the supposed price leader, abandoned its own quotation and started selling aluminum ingot at low prices. Alcan has been considered excellent in price competitiveness. Alcan's reasons for starting to release low priced aluminum ingot are as follows: "It may be a part of Alcan's strategy to kick down competitors such as Japanese aluminum smelters which have been in a tight siutation due to the persistence of a sluggish market."

Whether or not Alcan adopts an aggressive low-price strategy, excessive supplies in the world aluminum market are expected to continue increasing. In the Middle East, oil-producing nations began smelting aluminum one after another in order to utilize their natural gas. They are supposed to start exporting 500,000 tons of aluminum ingot several years from now. Overseas aluminum smelting projects promoted by Japanese aluminum smelting companies, such as the Asahan project in Indonesia, are about to start full operation. On the other hand, demand is not increasing as much as anticipated, partially because of the worldwide economic recession.

As a result, this is the greatest buyers' market for aluminum ingot ever. The world aluminum industry seems to have plunged from "an age of coexistence" into "an age of competitiveness." Not only Alcan, but other majors such as Alcoa of the United States, the world's largest aluminum smelter and roller, and France's Pechiney-Ugine-Kohlmann are forced to review their world strategies. This is the current condition in the aluminum industry.

Active Tieups of International Capital

Under these conditions, international tieups have become popular in order to make up for each other's weaknesses. This April, Showa Light Metal announced that it had reached an agreement on a capital tieup with Comalco, an Australian aluminum smelting and rolling company, and its parent company, CRA--an announcement which shocked the Japanese aluminum industry. This is one example of an international tieup.

The content of the agreement is as follows: Showa Light Metal will increase its capital from 17 billion yen to 50 billion yen; Australia's CRA will subscribe to half of the total capital--25 billion yen; at the same time Showa Denko will transfer its shares of Showa Aluminum and Sky Aluminum, aluminum rolling companies in the Showa Denko group, to Showa Light Metal; and thus CRA will indirectly subscribe to the shares of those two aluminum rolling companies.

Here we can see Showa Denko's decision to give up domestic smelting quickly and try to find an alternative way to rebuild its aluminum business by means of a tieup with foreign capital. However, CRA also has its own reasons for spending an enormous 25 billion yen.

Comalco owns aluminum smelting facilities with capacity to produce 200,000 tons a year in Australia and New Zealand. It is also the largest shareholder in the Boyne project developed jointly with Japan. It is currently pursuing an expansionary policy. Comalco's weakness in comparison with the so-called majors, however, is a lack of stable customers for aluminum ingot. As for exports to Japan, it sells aluminum ingot to Kobe Steel, a rolling mill, and some others. However, its aluminum ingot is sold in spot transactions. Along with its expansion of production capacity, Comalco needed stable customers for aluminum ingot. For this reason, it had its eyes on the Showa Denko group.

That same April, Alcoa of Australia, a subsidiary of Aloca, requested three Japanese aluminum smelting and rolling companies to subscribe to shares in its aluminum smelting project in Portland, Victoria. This was also intended to seek a sales route for aluminum ingot in Japan. The three Japanese companies which were approached by Aloca of Australia--Mitsubishi Light Metal, Sumitomo Aluminum Smelting, and Furukawa Aluminum--all have contracts with Alcoa of Australia to buy large quantities of alumina. Due to the reduction in domestic smelting, however, the three companies now cannot accept the contracted quantity of alumina. Although Alcoa of Australia says that the request for subscription to shares in its new project has nothing to do with the alumina contracts, it is also true that its request is not something the three companies can simply reject.

Among Japanese aluminum smelters, Nippon Light Metal, Toyo Aluminum (Alcan holds 50 percent of the shares of both), and Furukawa Aluminum (Alcoa holds 33 percent of its shares) already have close capital tieups with the majors. Mitsubishi Aluminum, which used to have a tieup relationship with Reynolds, cancelled its ties in early June. Together with Mitsubishi Light Metal, it is attempting to approach Aloca. Taking into account the Sumitomo and Mitsui groups, which are independent of foreign capital, tieups of Japanese aluminum makers with foreign capital will increase hereafter.

The Uneasy Relationship Between Smelters and Rolling Mills

In the meantime, there is a possibility that a change may occur in the relationship between smelters and rolling mills in Japan. At present, the purchase of relatively expensive domestic aluminum ingot because of a past relationship means nothing but suicide for rolling mills. The price level of imported aluminum ingot is 300,000 yen per ton. Even if 40,000-50,000 yen is added for miscellaneous expenses and the middleman's profit margin, it is lower by far than the 488,000 yen per ton domestic quotation calculated on the basis of production costs of domestic aluminum smelters. At present, the difference between the domestic quotation and the actual sales price is absorbed by the smelters as their deficit. This difference is expected to expand hereafter, and is likely to exceed the limit of the smelters' tolerance. If the rolling mills sympathize with the smelters and share the burden, they will go bankrupt together. The rolling mills must shut their eyes to the smelters' plight and cut off their business relationships.

Among the rolling mills, building materials and sash makers have been engaging in a bloody sales war. In order to win in this severe competition, small and medium-size sash manufacturers are naturally attracted to cheaper foreign aluminum ingot imported by trading companies. Major rolling mills began to secure supplies of foreign ingot as early as 2-3 years ago. In the case of the Boyne project in Australia, for example, three companies—two major rolling mills, Sumitomo Light Metal and Kobe Steel, and one sash manufacturer, Yoshida Industries—together own 36 percent of the shares. At present, they bring 73,000 tons of aluminum ingot a year into Japan.

Furthermore, rolling mills and sash makers which have a close relationship with domestic smelters also have started to secure supplies of foreign ingot recently. Sankyo Aluminum Industries, which has a close relationship with Sumitomo Aluminum, decided to use imported aluminum ingot and signed a long-term contract with a Spanish smelter. This can be said to be a symbolic development.

Sankyo Aluminum, a rolling mill, and Sumitomo Aluminum, a smelter, formed the core of the new industrial city plan featuring the Toyama New Harbor in Toyama Prefecture. Together they made up one smelting-rolling system. Even Sankyo Aluminum was pressured to reexamine completely its relationship with the domestic smelting industry. Simitomo Aluminum is still operating its smelting facility in Toyama at the scanty pace of 1,000 tons a month. Sankyo Aluminum and its related rolling mills are still buying Sumitomo Aluminum's ingot little by little. However, the true feeling of Sankyo Aluminum Industries is that "our relationship with Sumitomo Aluminum has reached the limit." On the other hand, if Sankyo Aluminum totally stops buying aluminum ingot from Sumitomo Aluminum, the latter will lose its largest customer and therefore be forced to close the plant. Then, the whole industrial region surrounding the Toyama New Harbor will be damaged greatly.

Not only in the case of Toyama but also in many other local industrial districts, the aluminum smelting industry's slump is casting a dark shadow over the local economy. With the dissolution of Sumitomo Light Metal Aluminum, its smelting plant in Sakata City, Yamagata Prefecture ended a short operational history of 5 years. Sumitomo Light Metal Aluminum had accounted for 31 percent of manufactured good shipments in Sakata. As a result, Sakata petitioned MITI for designation as a depressed area. Sakata's local government has been busy working out countermeasures.

Sumitomo Light Metal Aluminum originally decided to build a plant in Sakata, a city with a population of 100,000, and signed a contract with the prefecture to purchase land. That was in July 1972, 1 year before the first oil shock. At the time of Sumitomo Light Metal Aluminum's move, Yamagata Prefecture and Sakata City had drawn up a regional development plan based on the assumption of high economic growth. The prefecture and city planned to expand Sakata's north bay to build an industrial harbor. Once the harbor was complete, they intended to invite enterprises to build plants. This was a survival measure for Sakata, which was located between the new industrial cities of Akita and Niigata. According to "The Plan To Establish a Sakata Coastal Industrial District" prepared by Yamagata Prefecture at that time, the future Sakata was supposed to be a city of basic materials industries such as aluminum, steel, and lumber. The aluminum industry's withdrawal destroyed the city's magnificent plan while its architects were still dreaming of the first stage.

Not only Sumitomo Light Metal Aluminum in Sakata but also Showa Light Metal in Kitakata City, Fukushima Prefecture, is planning to shut down a smelting facility. In the case of both Sakata and Kitakata, the local governments came to realize that the companies' arrivals and departures were based solely on internal corporate calculations. Local governments do not have the power to overturn corporate policies.

Expectation for a New Smelting Method That Does Not Need Electricity

At any rate, the Japanese aluminum smelting industry is on the verge of annihilation. If the industry sits and waits, annihilation will be the only outcome. The Japanese aluminum smelting industry once possessed the capacity to produce 1.64 million tons a year. According to the structural reform measures after the first oil shock, however, some facilities were abolished or shut down. As a result, official capacity is currently 1.11 million tons per year. However, the capacity of facilities actually operating now is below 500,000 tons per year. And the supply still tends to be excessive. Production of ingot dropped sharply to 208,361 tons in the first half of this year, a 51.4-percent decrease from the same period a year ago. On the other hand, imports of aluminum ingot in the first half of this year reached a record high 650,677 tons (a 33.6-percent increase over the same period a year ago).

The aluminum smelting industry has desperately appealed to the Aluminum Subcommittee of the Industrial Structure Council for a series of cost-cutting and development measures, such as the lowering of the unit cost of electricity. However, the industry's desperate appeals could not persuade the electric power industry to abandon its cost formula. It could at most obtain a 1-2 yen reduction by widening application of a special rate equivalent to the night users' rate in the present rate structure.

In addition, revival of a tariff quota system has been discussed. At present, a 9-percent tariff is imposed on aluminum ingot imports. The tariff quota system involves the government's reduction of the tariff to zero in ingot developed and imported by Japanese smelting companies and by a certain percentage on ingot imported by users. Then, importers would be asked to contribute the money saved through tariff reduction to a rescue fund for the aluminum smelting industry. This system was adopted by the Industrial Structure Council previously, and carried out in FY-78 and FY-79. The Ministry of Finance, however, strongly opposes the tariff quota system. Moreover, the Second Provisional Administrative Reform Council has been asserting its major policy of reducing government subsidies. It is hard to predict how substantial this system may be when it is adopted as a policy.

Putting aside the question of effectiveness, the industry hopes to survive in the following way.

The price of Japanese aluminum ingot is about 500,000 yen per ton, including a certain percentage of profit. Except for extremely cheap spot prices, the price of imported ingot is about 370,000 yen per ton. Various expenses for importation are 40,000-50,000 yen. The advantages of domestic ingot, such as reliable delivery and no exchange risk, may be worth about 20,000 yen. In this case, the price differential between domestic and foreign ingot is 60,000-70,000 yen per ton.

The demand for aluminum is assumed to be approximately 2.1 million tons in 1985. Suppose we want to save facilities for producing one-third of the demand--700,000 tons a year. Of the facilities to produce 700,000 tons a year, those producing 200,000 tons a year are already competitive. Therefore, the industry wants some countermeasures to supplement the gap of 60,000-70,000 yen per ton for facilities producing 500,000 tons a year. Assuming the gap is 70,000 yen, a fund of 35 billion yen is needed.

The most desirable way of closing the gap would be to lower the cost of electricity. If the cost of electricity cannot be lowered, the gap must be supplemented by a tariff. In this case, this measure must be of medium- to long-term duration, until the gap between domestic and foreign prices shrinks due to an increase in overseas development costs, instead of the limited 1-2 years as in the previous case. This is the survival measure for which the industry hopes.

As a more fundamental measure, the industry has been jointly engaging in research on "an aluminum smelting method that does not use electricity." In addition to Mitsui Aluminum, which has been doing research and development on its own, Nippon Light Metal, Showa Light Metal, Mitsubishi Light Metal, and Sumitomo Aluminum have joined the joint research,

The five companies are rushing to form a joint research association based on MITI's concept of a joint government-private sector development plan. MITI's plan is as follows: (1) the aluminum smelting companies would form a research and development cooperative with the companies paying operational expenses; (2) in order to establish a blast furnace smelting technology, the cooperative would rebuild an experimental plant with capacity to produce 1-2 tons of aluminum ingot per day, and then put a developed method into practical use in 6 years; and (3) the government would pay the 6-billion-yen cost of building an experimental plant. The five companies have already reached basic agreement on each company's contribution to the cooperative, maintenance of secrecy on new technologies, and measures to spread the risk. The immediate goal is to build a bench-scale plant for 520 billion yen by the end of March 1984.

The present electrolytic method smelts aluminum by turning bauxite into alumina and then electrolyzing alumina to obtain aluminum. The blast furnace method, however, is different from the present electrolytic method. It is intended to produce aluminum in a furnace, as in the case of steel. Specifically, the process is to put a clay and coke dumpling into a blast furnace, to raise the temperature inside the blast furnace to over 2,000 degrees C by blowing in pure oxygen to make a compound metal that includes aluminum silicate and iron, to add liquid lead to the compound metal so that the lead can absorb the aluminum, and to lower the temperature to extract the aluminum. In addition to using no electricity, this method has other merits such as possible diversification of materials and the merit of scale economies.

The industry has the new method under particularly close scrutiny as a means of eliminating the difference in production costs between domestic and foreign aluminum ingot, which would be impossible with the electrolytic method.

The blast furnace smelting method has been developed jointly by Mitsui Aluminum, Mitsui Alumina, and Mitsui Mining and Smelting. They perfected the new method in the laboratory and applied for a patent at the end of last year. In practical application, however, there remain various problems such as developing furnace equipment which can tolerate temperatures 1,000 degrees C higher than in steel making, problems that accompany operation of large blast furnaces, and the technical problem of establishing a continuous operational technique. Furthermore, even if they succeed in putting the furnace smelting method into practical use, how can the virtually bankrupt aluminum smelters raise the enormous capital investment required for the new facilities? In reality, the prospects of this method are still unknown.

Still, We Need Domestic Smelting

Along with the formulation of survival measures at the policymaking level, each maker has been working industriously for survival.

Their efforts can be divided into two types. One type is a tendency to retain domestic smelting capacity by any means and switch electric power sources from crude oil to coal. Another is a tendency to reduce domestic smelting, to develop smelting operations overseas which would ship ingot to Japan, and to save the aluminum rolling and processing businesses in Japan. Nippon Light Metal has been positively shifting emphasis from the material department to the processing department in order to raise the value added of its output. As previously mentioned, the Showa Denko group has signed a tieup contract with CRA-Comalco and shifted from domestic smelting to imported ingot. These are examples of the latter tendency. Sumitomo Aluminum has been exporting smelting technology and has achieved a good record. Whether switching to coal, changing the smelting method, or depending on foreign ingot, the risk is great. In the case of switching to coal-generated electricity, which depends on foreign coal, in particular, it is not clear how competitive domestic smelting by this means can become.

If domestic smelting can survive as an industry, it can only happen under the following conditions.

First of all, the immediate crisis must be solved through financial support and a tariff quota system. In the meantime, world demand will increase and therefore prices will rise. On the other hand, world aluminum manufacturers' smelting projects in Australia and other places will be delayed. Then, the trend will be toward supply shortages in the future. With expansion of inflationary capital investment, the cost of ingot produced in new plants will keep rising. The majors' quotations will be determined by the cost of ingot produced in the new plants. Meanwhile, the price of coal will moderate. After switching to coal, domestic ingot prices will become competitive with imported ingot purchased under long-term contracts. Eventually, the new smelting method will be proved out.

The possibility of future events following such a scenario cannot be entirely denied. Depending on the correlation between energy costs and capital investment costs, the gap between the prices of domestic and foreign ingot may be reduced. Actually, however, users such as rolling mills and sash makers have been increasing purchases of foreign ingot on the spot market and decreasing use of domestic ingot.

Users insist on domestic ingot when they need high purity aluminum ingot, but this is only a very small portion of total demand for aluminum ingot. From 1979 through early 1980, domestic smelting companies which were eager to reduce deficits kept raising the domestic quotation of aluminum ingot as the international market prices rose. This fact weakens the smelters' argument that the existence of domestic ingot capacity enhances the bargaining power of ingot purchasers.

Although noting Japanese smelters' loss of competitiveness, the majors have not acted to exploit the opportunity. Hereafter, however, they may try to gain a market share in Japan with the weapon of favorable long-term contracts.

Doesn't Japan need its own aluminum smelting industry? From the long-term viewpoint, demand for aluminum will increase. If Japan depends on foreign ingot to meet its entire demand, we will need various, diversified long-term contracts in order to avoid country risk. In today's world situation where we do not know what will happen next, abolition of aluminum smelting in Japan is questionable from the standpoint of national security. We can develop smelting plants overseas and import ingot, or we can export smelting technology, while we maintain our own aluminum smelting industry. By having our own smelting industry, we can maintain technology and raise funds for capital investment.

According to a survey conducted by the Japan Aluminum Federation, 28.6 percent of the free world's aluminum smelting capacity was nationalized in 1981 (a 4.4 percent increase from the previous year). Within Europe, the percentage has reached 61 percent (a 12.8 percent increase from the previous year). Outside the United States, most countries follow a one-or-two-companies-per-country system. Judging from this, it is clear that a certain domestic smelting capacity is necessary in order to secure a stable supply of aluminum ingot over the long term. For this reason a drastic reform of the condition of the aluminum smelting industry is necessary.

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FY 83 SCIENCE, TECHNOLOGY-RELATED DRAFT BUDGET REPORTED

Tokyo KAGAKU SHIMBUN in Japanese 10 Sep 82 p 1

[Text] The FY 83 draft budget preliminary funding requests, as submitted by the various ministries and agencies to the Ministry of Finance before the end of August, have been made public by the respective ministries and agencies. In the science and technology [S&T]-related category, the Ministry of Education, which is responsible for the promotion of basic sciences (academic), is seeking funds for scientific research subsidies and for the expansion and intensification of energy-related scientific research. Of the S&T-related funding requests by the Science and Technology Agency, other than a threefold-plus increase over last fiscal year being sought for the international science fair (scheduled to open in March 1985), the funding levels requested for the development of atomic power, space, and the ocean remain pretty much the same as before. The International Science and Technology Agency, under the Ministry of International Trade and Industry, has newly requested funds for a large-scale project, "Development of the ultimate-work robot." The Agriculture, Forestry and Fisheries Research Council, under the Ministry of Agriculture, Forestry and Fisheries, has requested funds for an organizational restructuring (abolishment of two research laboratories, major scaling-down of one laboratory, and establishment of two new laboratories).

Ministry of Education

The FY 83 budget request of the Sciences Internationl Bureau, Ministry of Edcuation, has placed its main thrust on the expansion of funds for scientific research and on the promotion of key basic research. Subsidies for scientific research will exceed the 40-billion-yen mark by 200 million yen, an increase of 5.79 percent over the preceding fiscal year. As for key basic research, energy-related scientific research calls for 30.33 billion yen, an increase of 25.18 percent over the preceding fiscal year.

1. Expansion of Scientific Research Funds

"Subsidies for scientific research expenses" in the amount of 40.2 billion yen (vs. 38 billion yen last fiscal year) are being sought; this is an increase of 5.79 percent over last fiscal year.

Of this amount, 2 billion yen (vs. 1 billion yen) will go to "special priority research" and 3.573 billion yen (vs. 2.98 billion yen) to the "promotion of joint research with private researchers," both of which will thus receive added emphasis.

"Subsidies for private university research facilities, etc." call for 2,005,936,000 yen (vs. 2,205,936,000 yen), a reduction of 200 million yen from last fiscal year, reflecting the thrust of the basic report given during the preliminary hearing.

2. Promotion of Key Basic Research

Earmarked for "promotion of energy-related scientific research" is 30,338,434,000 yen (vs. 24,228,228,000 yen), reflecting a large increase of 25.18 percent over last fiscal year.

a. Scientific research subsidies for "energy special research:" 2.1 billion yen (vs. 2.1 billion yen)

b. For energy-related scientific research at national universities: 17,851,434,000 yen (vs. 16,770,228,000 yen), of which:

(1) For nuclear fusion research: 12,961,165,000 yen (vs. 11,999,219,000 yen)

(2) For research related to new energy sources and energy conservation: 4,890,269,000 yen (vs. 4,771,009,000 yen)

c. For accelerator science (The 2nd Accelerator Plan; the 3d Year Phase of the Tristan Plan): 10.387 billion yen (vs. 5.358 billion yen)

The amount requested for "clarification of space and earth environment" is 22,084,232,000 yen (vs. 18,143,798,000 yen), an increase of 21.72 percent over last fiscal year.

a. For space science (launching and observation of scientific satellites): 15,672,265,000 yen (vs. 12,926,027,000 yen)

b. For oceanographic science (international deep-sea excavation plan; IPOD share contribution): 458 million yen (vs. 372,125,000 yen)

c. For early detection of earthquakes and volcanic eruptions: 3,301,094,000 yen (vs. 2,228,326,000 yen)

d. For Antarctic region observation work (conducting the 25th observation; launching a new icebreaker, the "Shirase"): 3,652,873,000 yen (vs. 2,617,320,000 yen)

The amount requested for "life science studies" is 734,777,000 yen (vs. 310,663,000 yen), an increase of 36.52 percent [as published; should be 136.52 percent] over last fiscal year. Cell engineering research is one of the items to be intensified.

3. Improvement of Academic Exchange and Cooperation Posture

For "preparatory survey for establishment of University Science Hall (tentative name): 60,134,000 yen (vs. 20,043,000 yen)

For "improvement of a joint research system" (improvement of facilities jointly used by national universities): 23,995,228,000 yen (vs. 17,287,677,000 yen)

For "promotion of joint research with private sectors:" 3,503,620,000 yen (vs. 2,673,620,000 yen)

For "projects by Japan Society for the Promotion of Science:" 3,317,490,000 yen (vs. 3,120,136,000)

a. Invitation of 30 (vs. 20) young foreign researchers--the 10 new ones will be from France.

b. Scientific exchanges with developing nations.

4. Promotion of International Exchange and Cooperation

For "international scientific exchange and cooperation activities:" 4,000,631,000 yen (vs. 3,678,914,000 yen)

a. For scientific exchanges with developing nations: 476,612,000 yen (vs. 412,631,000 yen)

(1) Exchanges through the designated university-base system, (e.g., Kobe University Medical School with the Philippines; Tokyo University Engineering School with Singapore)

(2) Aid to individuals desiring to work on their doctoral dissertations (to accept 24 persons; to dispatch 12 persons)

b. For international joint research, etc.: 3,226,221,000 yen (vs. 3,022,645,000 yen)

(1) For the convening of international symposia: 123,688,000 yen

(2) For international joint research projects: 3,102,433,000 yen (vs. 2,951,248,000 yen)

c. For cooperation with the United Nations University (preparation of basic plans for central facilities, etc.): 256,154,000 yen (vs. 224,156,000 yen)

d. For testing Japanese-language ability of foreigners: 3,872,000 yen (new item)

e. Invitations to 50 (vs. 25) English-language instructions of British nationality

For "sending students abroad for study:" 8,016,328,000 yen (vs. 6,912,060,000 yen)

For "educational cooperation through UNESCO, etc.: 946,091,000 yen (vs. 889,364,000 yen)

For "education of Japanese children overseas:" 15,183,653,000 yen (vs. 12,805,877,000 yen)

Science and Technology Agency

The Science and Technology Agency has recently prepared and made public its preliminary budget request for FY 83. The amount requested consists of 332,096 million yen for the general account and 73,891 million yen for the special account of measures to promote the development of electric power, making the Agency's overall total 405.987 billion yen, an increase of 5.2 percent over the 386.088 billion yen last fiscal year.

Included in the budget for the next fiscal year is a request for 16.816 billion yen (3.5 times larger than the amount last fiscal year), for the construction of a government exhibit hall, etc., at the "science fair" of 1985, which is approaching rapidly. In addition, 6.661 billion yen, an increase of about 10 percent over last fiscal year, is requested for expansion of the promotion and regulation of science and technology; and 2.275 billion yen, an increase of about 15 percent over last fiscal year, is sought for the promotion of creative science technology. The funding request levels for atomic power and space remain about the same as in the preceding fiscal year.

"Reinforcement of the planning and regulatory function in science and technology administration through expansion of science and technology promotion subsidy:" 6.661 billion yen, of which:

a. For the expansion of the science and technology promotion subsidy: 6.661 [as published] billion yen

b. For the formulation of science and technology basic plans: 61 million yen

"Promotion of creative Science Technology through use of fluid research system:" 2.275 billion yen

"Promotion of atomic power development and utilization 176.21 billion yen, of which:

a. for atomic power safety regulatory administration and environmental safety measures: 2.132 billion yen

b. for Reactor and Nuclear Fuel Development corporation: 68.436 billion yen, on which:

-19.547 billion yen: development of fast-breeder reactors

-1.842 billion yen: development of an new model converter

-6.1 billion yen: overseas survey and exploration of uranium resources

-3.127 billion yen: development of uranium enrichment technology

c. For Japan Atomic Energy Research Institute: 84.03 billion yen

-7.471 billion yen: safety research

-34.572 billion yen: Construction of JT-60

-1.341 billion yen: Japan-U.S. nuclear fusion cooperation

-5.02 billion yen: research and development of multipurpose high-temperature gas reactor

d. For Japan Nuclear Ship Development Agency: 11.303 billion yen, of which:

-8.048 billion yen: improvement of newly designated mooring harbor

e. For National Institute of Radiological Sciences: 6.131 billion yen

f. For atomic power research by Institute of Physical and Chemical Research: 1.584 billion yen, of which:

-1.077 billion yen: construction of heavy-ion accelerator

"Promotion of space development": 87.676 billion yen, of which:

a. For National Space Development Agency: 86.307 billion yen

-24.629 billion yen: development of H-1 rocket

-4.569 billion yen: development of communications satellite No 2

-6.279 billion yen: development of broadcast satellite No 2

-4.932 billion yen: development of Geostationary meteorological satellite No 1

-12.06 billion yen: development of oceanographic observation satellite No 1

-768 million yen: development of V-model Technological Test satellite

-20 million yen: research and development of broadcast satellite No 3

-961 million yen: research and development of earth resources exploration satellite No 1

-1.212 billion yen: development of phase-one space materials experiment system

-55 million yen: research and development of improved rocket-launch capability

b. For space development research by National Aerospace Laboratory: 838 million yen, of which:

-91 million yen: research on key elements of liquid oxygen/liquid hydrogen rocket engines

-64 million yen: research on basic satellite technology

"Promotion of oceanographic development: 5.47 billion yen

a. For Oceanographic Development Center: 5.267 billion yen

-1.47 billion yen: construction of underwater experimental ship, as part of research and development of diving technology

-1.51 billion yen: research and development of deep-sea and submergence survey ship, including 8 million yen for exploration of 6,000-meter-class submergence survey ship system

-65 million yen: research and development of oceanographic energy

b. For other oceanographic development projects: 203 million yen

-96 million yen: survey and research on development and utilization of the Japan Current

-86 million yen: research and development of oceanographic remote survey technology

"Promotion of important general research:" 27.194 billion yen

a. For advancement of life sciences: 1.088 billion yen, of which:

-1.082 billion yen: life science activity at Institute of Physical and Chemical Research, including 553 million yen for construction of gene-alteration research facilities (P-4)

b. For promotion of disaster prevention science technology: 2.299 billion yen

-2.249 billion yen: disaster prevention research at National Disaster Prevention Science Technology Center, including 1.046 billion yen for research on early detection of earthquakes

149 million yen for research on earthquake disaster countermeasures, and 116 million yen for research on snow-damage countermeasures

c. For promotion of aeronautical research and development at National Aerospace Laboratory: 9.133 billion yen, including 5.834 billion yen for research and development of fan-jet STOL test plane

d. For Institute of Physical and Chemical Research: 6.931 billion yen, including 288 million yen for laser science technology research

e. For promotion of research and development work on material technology for such materials as related to science technology: 5.366 billion yen

-3.758 billion yen: materials research at Metal Materials Technology Laboratory

-1.608 billion yen: materials research at National Institute of Research in Inorganic Materials

f. For promotion of resources synthetic utilization methods: 372 million yen

-263 million yen: for National Institute of Resources

-75 million yen: corroborative survey of regional energy synthetic utilization system

-10 million yen: basic technology toward effective utilization of protein

g. For promotion of commercialization of new technologies and technology transfers: 2.005 billion yen

-1.979 billion yen: for Japan Research Development Corporation

-Ceiling for commissioned developmental contract amounts: 4.7 billion yen

"Promotion of international cooperation:" 14.78 billion yen

-Promotion of cooperation with advanced nations: 14.48 billion yen

-Promotion of cooperation with developing nations: 86 million yen

-Promotion of cooperation with international organizations: 214 million yen

"Improvement of the foundation for advancement of science and technology:" 4.992 billion yen, of which:

a. For strengthening the research foundation through training of researchers and other means: 365 million yen

b. For promotion of research exchanges at Tsuba Research Institute City: 61 million yen

c. For facilitation of information flow: 4.331 billion yen

"Promotion of preparations for holding the International Science and Technology Fair": 16.816 billion yen

-Promotion of government exhibit-related activities: 8.504 billion yen

-Aid to International Science and Technology Fair Association: 8.312 billion yen

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SCIENCE AND TECHNOLOGY

BRIEFS

PRC TOOLS' IMPORT--Osaka, 18 Oct (KYODO)--Fanuc Ltd., a major industrial robot and numerically-controlled (NC) equipment maker, said Monday it will purchase a machine center (MC) and other NC machine tools from China in November. Fanuc will be the first Japanese company to import NC machine tools from China. A company official said the company will buy an MC, NC grinder and NC lathe to be used at a company's manless factory for production of motors. China has produced the machines with technologies for controlling parts supplied by Fanuc but has made it possible to cut down production cost on its own. Compared with Japanese NC machines to equivalent capability, the Chinese equipment is much cheaper with each purchase price not exceeding an estimated dollar 50,000. Licensed by Fanuc, China began production of NC machine tools in September last year at an annual rate of 1 million units. China won an order of 10 NC grinders from the United States early this year, the official said. With China positive in continuous cooperation with the Japanese firm, the current purchase deal is taken by industry observers as a transitional step for Fanuc to export high-quality but cheap machine tools connected with industrial robots. [Text] [OW252351 Tokyo KYODO in English 0648 GMT 18 Oct 82 OW]

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